OFFICIAL PUBLICATION OF THE PROCEEDINGS AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

OCTOBER 15, 1951
VOLUME 40, No. 21

AMERICAN DYESTUFF REPORTER

DEVOTED TO TEXTILE CHEMISTRY • BLEACHING • DYEING • PRINTING • FINISHING

GREENVILLE PUBLIC LIBRARY

Cotton and Rayon White Goods Get their Sales Appeal in the MILL!

Sales-wise merchandisers always demand "best sellers." If they are production-wise as well, they rely upon the mill to develop a product that sells, knowing that sales appeal is created right in the mill.

TINOPAL BVA

Experienced mill men know that white goods with the ultimate in sales appeal are produced consistently, day in and day out, with Tinopal BVA* — made specifically for mill application. Tinopal BVA produces whiter whites and with better wash fastness, too.

Mills using Tinopal BVA have had plenty of proof that they are delivering white goods with the greatest sales appeal.

If you are producing white cottons and viscose rayons by any other means, decide now to try Tinopal BVA and compare the results. Write today for a sample and illustrated booklet.

* Reg. U. S. Pat. Off.

Geigy

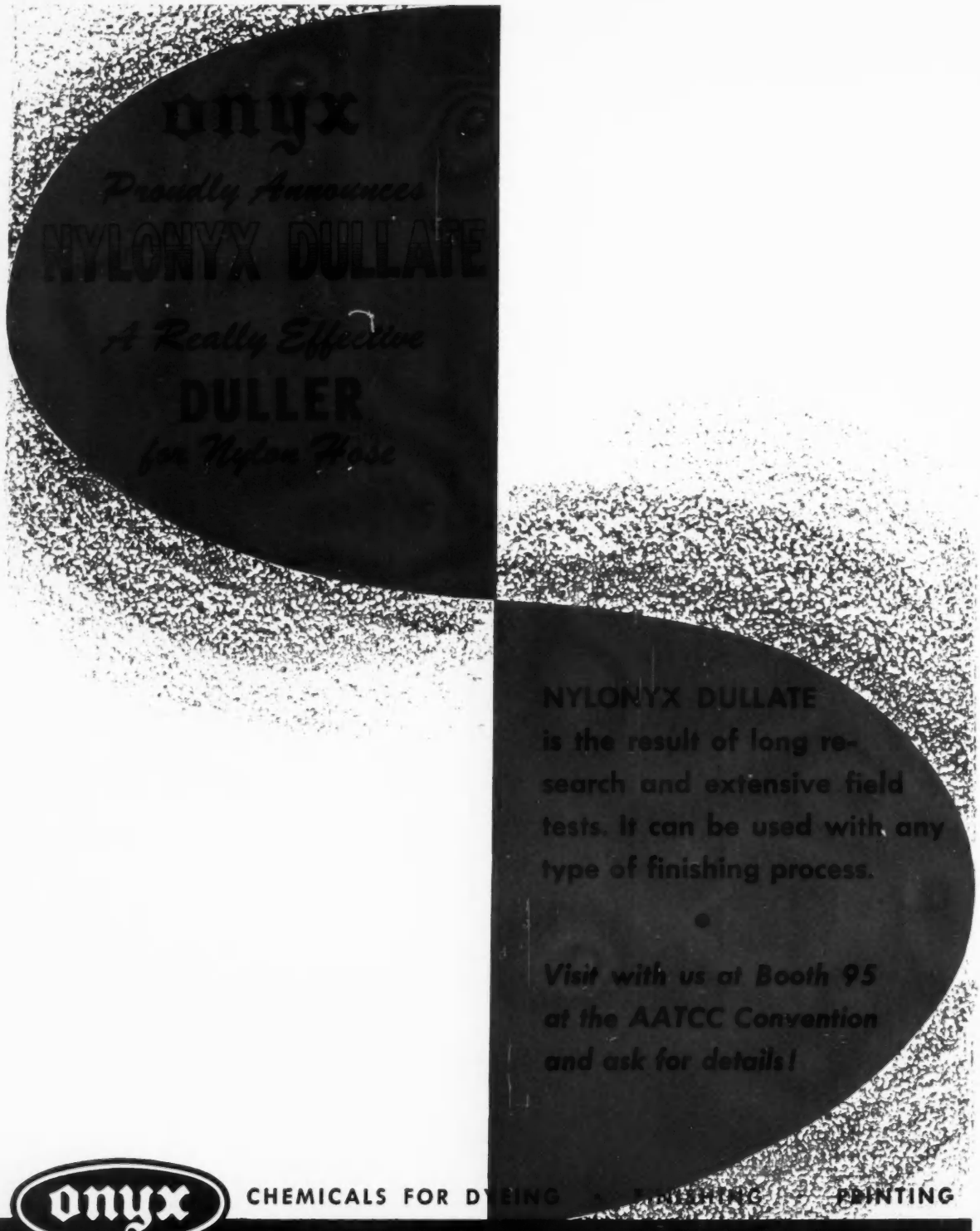
Dyestuff Makers Since 1859

GEIGY COMPANY, Inc.

89-91 BARCLAY STREET, NEW YORK 8, NEW YORK

BRANCH OFFICES: Boston • Charlotte, N. C. • Chicago • Los Angeles • Philadelphia
Portland, Ore. • Providence • Toronto

IN GREAT BRITAIN: The Geigy Co., Ltd., National Buildings, Parsonage, Manchester


onyx
Proudly Announces
NYLONYX DULLATE
A Really Effective
DULLER
for Nylon Hose
NYLONYX DULLATE
is the result of long research and extensive field tests. It can be used with any type of finishing process.
Visit with us at Booth 95 at the AATCC Convention and ask for details!

onyx CHEMICALS FOR DYEING · FINISHING · PRINTING

ONYX OIL & CHEMICAL COMPANY
TEXTILE DIVISION
190 WARREN ST., JERSEY CITY 2, N. J.
CHICAGO · BOSTON · CHARLOTTE · ATLANTA

In Canada, Onyx Oil & Chemical Co., Ltd., Montreal, Toronto, St. Johns, Que. For Export, Onyx International, Jersey City 2, N. J.

American Dyestuff Reporter, Vol. 40, No. 21, October 15, 1951. Published every other Monday. Copyright 1951, by Howes Publishing Co., Inc., 44 E. 23rd St., New York 10, N. Y. Domestic subscriptions, $5.00; Canadian, $6.00; Foreign, $10.00 Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

FROM CIBA RESEARCH...

NEW...IMPROVED OPTICAL FLUORESCENCE

NEW UVITEX RT*

Widely applicable, it is recommended for

WHITER WHITES

and better fastness to light and washing on

COTTON...VISCOSE RAYON
WOOL...SILK...NYLON...PAPER

Because of its unusual stability it can be used not only in the common plant applications but also to produce better whites—

1. On resin treated fabrics by incorporation in the resin bath.
2. On discharge prints by addition to the discharge paste.

Send for full details on UVITEX RT properties.

*Reg. U. S. Pat. Off.

CIBA

CIBA COMPANY INC.

627 GREENWICH STREET, NEW YORK 14, N. Y.

Boston Chicago Charlotte
Providence San Francisco Philadelphia

HOW LIXATE BRINE CUTS DYEING COSTS

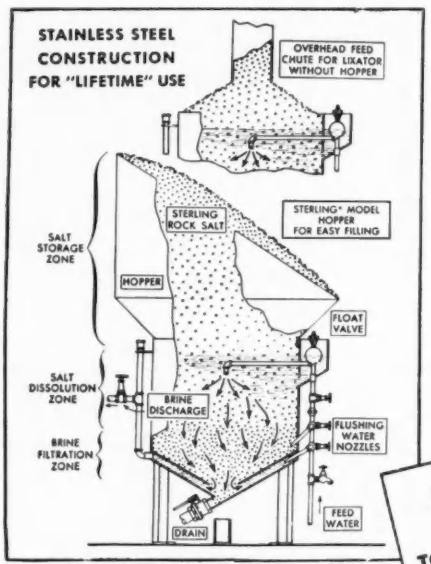
MORE UNIFORM DYEING: More and more plant managers are learning how to get better dyeing results, yet cut operating costs, by using Lixate brine. The use of saturated Lixate brine in the dye bath, instead of dry salt, improves the quality of finished goods by helping to eliminate spots, streaks and white edges. When dry salt is added, it tends to create areas of concentrated brine around the grains of salt. These concentrated areas drive excessive quantities of dye into fabrics, causing spots and streaks. Lixate brine helps overcome this difficulty because it disperses instantly and evenly through the bath, producing a smooth exhaustion of the dye.

CUTS SALT CONSUMPTION: Many mills report that they use approximately 12% less salt when Lixate brine is used in the dye bath. This is because saturated brine is more efficient as an exhausting agent. One gallon of saturated brine contains 2.65 pounds of salt. But when used as the exhausting agent, one gallon of saturated brine appears to be equivalent to three pounds of dry salt. This is the figure used for best dyeing results by actual experience.

CUTS OPERATING COSTS: Results at mills that have changed from dry salt to Lixate brine indicate that brine increases plant efficiency and reduces operating costs. The brine method not only helps eliminate redyeing, but also cuts down on unnecessary salt handling because brine is made automatically and piped throughout the plant.

HOW IT WORKS: An engineering development of the International Salt Company, Inc., Scranton, Pennsylvania, the Lixator consists of a rock salt storage hopper over a dissolving tank with a brine collection chamber. Rock salt flows by gravity into the tank at the same rate it is dissolved, automatically replenishing the supply. Water enters near the top. As water flows downward, it dissolves the rock salt, until it becomes fully saturated some distance from the bottom of the tank. From that point on the remaining rock salt acts as a filter bed that removes all insoluble matter from the brine. As a result, when it reaches the collection chamber, the brine is crystal clear and fully saturated. Lixate brine is always crystal clear and neutral — free from acids and alkalies — and for that reason is also used to regenerate zeolite water softeners. The same Lixator provides saturated brine for this purpose and for use in the dye vats. Lixators may be made in any size to meet individual plant requirements.

SALT! WHY HAUL IT? MEASURE IT? STIR IT?



Just Turn It On!

STERLING ROCK SALT BRINE DELIVERED BY PIPE TO EVERY POINT IN YOUR PLANT
- DYEING MACHINES
- DYEING VATS
- ZEOLITE WATER SOFTENERS

HOW LIXATOR* WORKS

In the dissolution zone — flowing through a bed of Sterling Rock Salt which is continuously replenished by gravity feed, water dissolves salt to form 100% saturated brine. **In the filtration zone** — through use of the **self-filtration** principle **originated by International,** the saturated brine is thoroughly filtered through a bed of undissolved rock salt. The rock salt itself filters the brine. Nothing else is needed.

WHAT THE LIXATOR PROVIDES

- ✓ **Chemical and bacterial purity to meet the most exacting standards for brine.**
- ✓ **Unvarying salt content of 2.65 pounds per gallon of brine.**
- ✓ **Crystal-clear brine.**
- ✓ **Continuous supply of brine.**
- ✓ **Automatic salt and water feed to Lixator.**
- ✓ **Inexpensive, rapid distribution of brine to points of use by pump and piping.**

Savings up to 20% and often more in the cost and handling of salt have been reported by many Lixate users. Why not investigate?

• You can eliminate shoveling, hauling, and laborious hand stirring of salt and water, and frequent testing of the brine strength — with International's Lixate Process for Making Brine. Stops waste through spilling. Saves time and labor. Assures accurate salt measurement.

• The Lixator *automatically* produces 100% saturated, free flowing, crystal-clear brine — which may be piped to as many points in your plant as you desire — any distance away — by either gravity or pump. YOU SIMPLY TURN A VALVE for self-filtered, LIXATE Brine that meets the most exacting chemical and bacterial standards.

An INTERNATIONAL Exclusive

The LIXATE* *Process*

FOR MAKING BRINE

*REG. U. S. PAT. OFF.

INTERNATIONAL SALT COMPANY, INC., Scranton, Pa.

Triple assurance of wash-fast REDS

nonbleeding—noncrocking

AMANIL NAPTHOLS
FAST COLOR SALTS AND BASES
STABILON

For the **fastest napthol reds** obtainable, rely on performance-proved AMANIL* Napthols and Fast Color Salts or Bases. Combinations provide extensive shade variety. Extreme **solubility** and **stand-up** insure wash-fast dyeings to meet strictest market requirements.

And to eliminate the usual difficulties encountered in Napthol dyeing and printing, count on unsurpassed A.A.P. STABILON*. Removes free color lake formations for **minimized crocking** and **brightened** Napthol shades.

A call or letter to our nearest branch brings full information. A.A.P. technicians will be happy to demonstrate any of these products in your plant.

AMERICAN ANILINE PRODUCTS, INC.

50 Union Square, New York, N. Y. • **Plant: Lock Haven, Pa.** • **Branches:** Boston, Mass. Providence, R. I. • Philadelphia, Pa. • Charlotte, N. C. • Chicago, Ill. • Los Angeles, Cal. Chattanooga, Tenn. • **Dominion Anilines & Chemicals, Ltd.** • Toronto, Canada • Montreal, Canada

*Reg. U. S. Pat. Off.

WYANDOTTE ANNOUNCES

Another FIRST!

KREELON CD

the only promoted industrial detergent on the market!

It's a fact! Kreelon* CD is the first promoted industrial detergent ever offered in one product —the only product of its kind on the market today. Developed by Wyandotte and available only at Wyandotte, it combines the advantages of an excellent synthetic detergent and an excellent detergent-promoter.

What does this mean to you? If cotton's your line, you'll find that Kreelon CD will do a far superior job for your scouring, kier boiling, after-soaping and in other phases. It imparts superior soil removal properties . . . provides greater prevention of soil redeposition . . . will give much brighter color. And if you're in wool, silks or synthetics, you'll find Kreelon CD excellent for your processing operations.

Strong claims—yes, but we can back them up. Let us show you how the use of Kreelon CD can save you time, trouble and money. We'll be glad to work with you—no obligations, of course. Get the jump on competition—write us today.

Fast facts about Kreelon CD

- Kreelon CD can be substituted for the anionic detergent you're now using—and you'll get 20% to 70% improvement in soil removal and whiteness retention.
- Kreelon CD dissolves rapidly—is easy to use, fast-acting. It is also dustless.
- Kreelon CD is economical. A promoted detergent containing Garbose*, it gives you the advantages of a synthetic detergent and detergent-promoter in one product. It's ready to use — saves you storage space, handling and mixing time.
- In the processing of cotton, Kreelon CD is far more efficient than any synthetic detergent alone. It delivers superior results in scouring, kier boiling, dyeing, bleaching, desizing and finishing.
- In the processing of wool, Kreelon CD is highly effective in raw wool scouring, carbonizing and dyeing. In silks and synthetics, it is recommended for desizing, bleaching and scouring.

Reg. U. S. Pat. Off.

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE
HYDROGEN • DRY ICE • SYNTHETIC DETERGENTS • GLYCOLS
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE • PROPYLENE
DICHLORIDE • AROMATIC SULFONIC ACID DERIVATIVES
OTHER ORGANIC AND INORGANIC CHEMICALS

Wyandotte CHEMICALS
REG. U. S. PAT. OFF.
Wyandotte, Michigan
OFFICES IN PRINCIPAL CITIES

REPCOLENE -545

an all-purpose efficient ...ting, dispersing ... levelin... agent

When dyeing Naphthols, ...ENE-545 aids in penetration, level dyeing and ...es crocking.
With sulphur colo... COLENE-545 produces brighter, bloomier shades ...reduces tendency of crocking.
On wool, REPCOLENE-545 produces good ...ne and penetration, particularly on hat bo...ies and felts.
REPCOLENE-545 is an excellent stripping assistant for vat dyes.
• Complete information sheets are available.

REFINED PRODUCTS CORPORATION

LYNDHURST *Manufacturing Chemists* NEW JERSEY

Southern Representative: DYER S. MOSS COMPANY, 2511 Lucena St., Charlotte 6, North Carolina
New England Representatives: E. L. LEGG, 8 Harding Ave., Providence, R. I.; DONALD R. MacLEAN, Box 202, So. Dartmouth, Mass.
California Representative: SIDNEY SPRINGER, 2300 S. Vermont Ave., Los Angeles 7, California
Pennsylvania, Maryland, Delaware Representative: JOSEPH E. GOODAVAGE, Pine Rd., Huntington Valley, Pa.
Canadian Selling Agent: Reliable Color & Chemical Company, 43 Hughson St., North Hamilton, Ontario
Export Division Manager: Chester Feil, Refined Products Corp.

INTERCHEMICAL

Your Most Logical Source for the Finest Textile *Colors*

INTERCHEMICAL CORPORATION

Textile Colors Division

Rock Hill, S. C. Hawthorne, N. J. Pawtucket, R. I.

In Daylight or Lamplight

THE SHADE STAYS THE SAME

With Selected Interchem Acetate Dyes

Why run the risk of having fabrics returned because the shades change in artificial light! Interchemical technicians developed a series of color combinations to give you minimum shade change in different lights. They're well suited for all-acetate fabrics and help solve the complex problems in dyeing wool and acetate blends.

These special combinations of Interchem Acetate Dyes are another reason why Interchemical is your most logical source of supply for the finest textile colors. They provide good all-round fastness for men's wear, women's wear, carpets and draperies. Write for full details today.

Aridye PIGMENT COLORS Reg. U.S. Pat. Off.

Interchem Dyes Reg. U.S. Pat. Off.

Arigen Dyes Reg. U.S. Pat. Off.

White Magic
in
white discharge printing
on cotton, silk, rayon or wool
with keltex®
...the modern print paste thickener
Keltex truly works magic with Whites...assures sharp, clean-edged line...brings you additionally these important advantages:
Exact and uniform printing paste viscosity
Maximum penetration
Ease and economy of use
Readily soluble in cold water
No cooking or special treatment
No filtering—free from grit and cellulose
Easily washed out after printing for soft and pliable hand
Equally effective in machine or screen printing
For detailed information write or call our nearest regional office.
KELTEX
REFINED ALGIN PRODUCT
keltex®... a product of KELCO COMPANY
20 N. Wacker Drive
Chicago 6
31 Nassau Street
New York 5
530 West Sixth Street
Los Angeles 14
Cable Address: Kelcoalgin

Announcing... a New EXTREMELY LIGHTFAST GREY

Maxvat*

GREY 2RT PASTE

We feel that this new Grey will fill a long-felt want. Samples and application data may be obtained from our representatives.

★ Reg. U. S. Pat. Off.

CHEMICALS O·M·B INC. DYES

OTTO B. MAY, INC.

DYESTUFF MANUFACTURERS SINCE 1917

1576

198 NIAGARA STREET NEWARK 5, N. J.

Southern Representative: **DYER S. MOSS CO.** Charlotte, N. C., Columbus, Ga.

Representatives: New England, Middle Atlantic States and Canada

CARBIC COLOR & CHEMICAL COMPANY, INC.

New York, N. Y., Philadelphia, Pa., Providence, R. I., Hamilton, Ont.
Charlotte, N. C. (Dyer S. Moss Co.)

To Manufacturers of
Dyestuffs • Textile Chemicals • Wet Processing
Machinery • Laboratory Equipment • Incidentals

THE SIXTEENTH ANNUAL PROCESSING REVIEW NUMBER will appear on DECEMBER 10th, 1951

One of the special features of past issues, which will be continued this year, is a listing of new products for the textile wet processing field.

You are invited to submit information concerning such products which you have brought out since November, 1950.

This information should include: the trade name of the product and a BRIEF summary of its uses. Please list each product on a separate sheet of paper. If illustrations are necessary, glossy photographs or black ink drawings should be furnished. If the trade name is registered or the product is patented and you wish this indicated, please so note.

In order to insure your products being listed in our issue of December 10th, information concerning them should be in our hands NO LATER THAN NOVEMBER 12TH.

It is important that you list ONLY those products which have been brought out since November, 1950.

The response from manufacturers in the past fifteen years has provided the basis for a most valuable and useful listing and we trust that you will again cooperate to the fullest extent.

AMERICAN DYESTUFF REPORTER

44 East 23rd Street • New York 10, N. Y.

AHCO PRODUCTS

Flower Petal SOFTNESS For Your Fabrics

THAT'S DURABLE!

That *natural* softness so desirable in fabrics is yours when you use AHCOVELS. AHCOVELS give fabrics a finer finish, smoother, flexible hand and softer drape!

Here are AHCOVEL performance features:

- ✓ Lasting resistance to usual laundering and dry cleaning.
- ✓ Good stability to heat and storage.
- ✓ Odorless.
- ✓ AHCOVELS E. — F. and R. assure full retention of light fastness of any color.

AHCOVELS A. and G. are cationic substantive softeners.

AHCOVELS E., F. and R. are anionic substantive softeners.

Ask about AHCOVELS for cotton, wool and synthetic fibers.

ARNOLD, HOFFMAN

PROVIDENCE • RHODE ISLAND

Associated with

Imperial Chemical Industries Ltd.

London, England

ARNOLD, HOFFMAN & CO., INCORPORATED • EST. 1815

Offices: Charlotte, Cincinnati, New York, Teterboro, Providence

Plants: Charlotte, N. C. Cincinnati, Ohio Dighton, Mass.

AHCOVELS

MAYPON • MAYPON • MAYPON • MAYPON

for wetting and dispersing purposes . . .

MAYPON SUPER K
and
MAYPON K
for
Household
and
Industry

MAYPON

PROTEIN—FATTY ACID—CONDENSATION PRODUCT

MAYPON 4C
for
Cosmetics

produced ONLY by
MAYWOOD CHEMICAL WORKS
MAYWOOD, N. J.

Samples
and
Literature

MAYPON • MAYPON • MAYPON • MAYPON

PON

N 4C

ics

S

PON

Another GDC achievement

MARHEN PROCESS

for controlled vat dyeing

This process provides an electronic control for the reduction potentials which govern the dyeing efficiency of the vat dyebath. The benefits are obvious:

- Eliminates improper balance of chemical assistants
- Prevents over-reduction of sensitive vat dyes
- Yields batch to batch uniformity
- Obviates the need for titration and test paper controls
- Substantial economies in the consumption of chemicals (Trial mill runs indicate savings up to 50%)
- Low cost of apparatus
- Process can be run by regular mill help

The Marhen Process was developed thru the joint efforts of the Technical personnel of the General Dyestuff Corporation and General Aniline and Film Corporation.

The Marhen Process is another GDC contribution to greater technical efficiency in the field of wet processing.

For information on this latest innovation in vat dyeing address our nearest office.

GENERAL DYESTUFF CORPORATION

435 HUDSON STREET • NEW YORK 14, NEW YORK

BOSTON • CHARLOTTE • CHICAGO • PHILADELPHIA • PORTLAND, ORE. • PROVIDENCE • SAN FRANCISCO

"light soaping is enough!"

—TO RINSE PRINTING THICKENER OUT COMPLETELY

AMBERFLO, a highly soluble printing thickener, deposits a soft print. Light washing rinses it out quickly. Easily. Completely. Using tap water. Result? Happier production men. And fabrics that warm a fashion designer's heart with their softness . . . sparkling color . . . finer hand and body.

AMBERFLO eliminates cooking, cooling and expensive mixing equipment. Simply blend it with chemicals and water. In a few minutes, the "color" is ready. Splitting is minimized on "Sheers" and other fragile fabrics, because it deposits a smooth, pliable film. Color yield is higher. Penetration and detail are excellent.

AMBERFLO is recommended for vat, rapidogen, direct, acid and acetate colors. Also white discharge.

National Starch Products,
270 Madison Avenue, New York 16, N. Y.

National
STARCH PRODUCTS

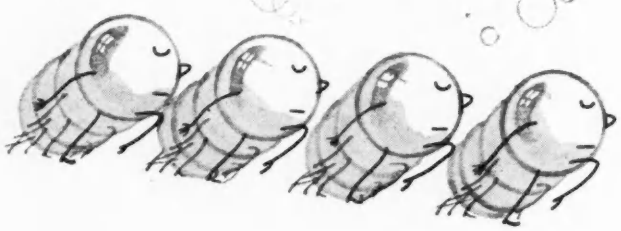
We want to know more!

We're interested in AMBERFLO—National's easy-rinsing, ready-for-use printing thickener.

☐ *We want more technical data.*
☐ *We'd like a plant demonstration.*

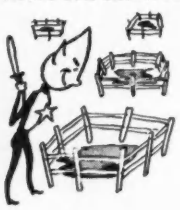
Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____

"Cal" Gon loves a PARADE



As usual, "Cal" Gon was being tossed about in a turbulent stream of water—"just like a good story at a stag picnic," he mused. Around him in the busy supply line jostled a motley mob of ions of all kinds, with here and there a molecule of oxygen obviously on the make.

"Ping-g-g," vibrated Cal, as an electric current tickled the bonds of phosphorus and oxygen atoms in his spine. "What gives?" he thought, as he quickly flipped his lanky framework of complex phosphate away from the wall of the pipe. "H'm, must have been the corrosion potential from that pit over there." Just then a ferrous ion slithered out of the rusty crust over the pit and into the stream, clutching a couple of hydroxyl ions and waving its loose flipper at Cal as it went by. Suddenly, its pale complexion turned red as an oxygen molecule brazenly grabbed its arm.



"So that's the way red oxide gets into the peroxide bleach!" snorted Cal. "Hey, fellows, we've got a job to do here. Fence in those ferrous ions so they'll think they're in a straight jacket!"

Cal's brothers swarmed onto the pipe surface, slamming the door of each little corrosion cell. Soon it was hard for Cal to find an escaped "iron man" in the crowd of ions sweeping on through the pipe.

Then he was in the bleach bath. Poking his head through the surface for a moment, he overheard the foreman say:

"Look at the brightness of that material, and with less bleach, too. Peroxide sure goes to town if you can keep iron out of the bath. It's unbelievable the way Calgon does that trick with only 4 to 8 ppm. in the water."

Thrilled with pride at that tribute and at the sight of millions of atoms of nascent oxygen marching in perfect cadence to the surface of the fabric, Cal stuck out his chest and swung into "I Love a Parade."

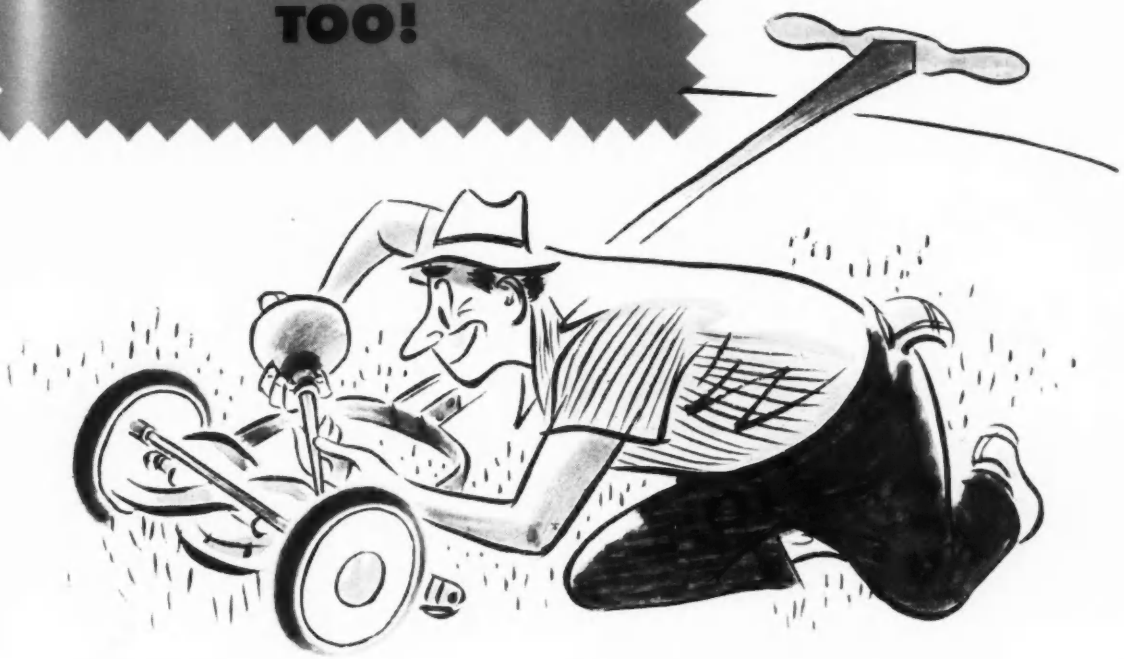
HAGAN
HALL
BUROMIN
CALGON

calgon, inc.

A SUBSIDIARY OF
HAGAN CORPORATION

HAGAN BUILDING
PITTSBURGH 30, PA.

FABRICS
NEED LUBRICATION, TOO!



Cottons and synthetics are improved when you use "Avitone" fiber softener. Here's why!

By lubricating the individual fibers, "Avitone" protects fabrics during high-speed sewing operations. There's less cutting or breaking of yarns because the needle slides easily between the lubricated fibers.

"Avitone" smooths and softens fabrics . . . makes them easier to work with. "Avitone" too, helps keep fabrics lovely . . . even during storage.

AND HERE'S MORE: "Avitone" doesn't turn rancid or discolor on aging. And "Avitone" does not interfere with shrinking processes.

Find out more about "Avitone." For further information, check with Fine Chemicals Div., E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware. Branch Offices: Atlanta, Boston, Charlotte, Chicago, New York, Philadelphia, Providence, San Francisco.

AVITONE
TRADE MARK
Fiber Softener

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

in wool dyeing...*

INDIGOSOL-O

for the Fast Navy!

*Save time . . . use your regular equipment!

CARBIC

Color & Chemical Company, Inc.

451-453 Washington St.
New York 13, N. Y.

Branches:
Philadelphia, Charlotte,
Providence, Los Angeles,
Hamilton, Ont.

Exclusive Distributors of
Pharmasols, Pharmols,
Pharmacines

AMERICAN
DYESTUFF REPORTER

NORMAN A. JOHNSON
Editor

CHARLES A. WHITEHEAD
Managing Editor

MYRON D. REESER
Business Manager

HERBERT A. STAUDERMAN
Advertising Manager

GRACE B. BURTON
Production Manager

M. H. MORGAN
Circulation Manager

Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists.

•

American Dyestuff Reporter was founded in 1917 and the Textile Colorist and Converter (formerly Textile Colorist) was incorporated with it in January, 1949. Published every other Monday by the **HOWES PUBLISHING COMPANY, INC., 44 E. 23rd Street, New York 10, N. Y. C. R. Howes,** President; **Harry F. Crawford,** Executive Vice-President; **Norman A. Johnson, Myron D. Reeser,** Vice-Presidents; **Ernest J. Finan,** Treasurer; **C. Essenbreis,** Secretary.

•

Also Publishers of
HOSIERY INDUSTRY WEEKLY
HOSIERY MERCHANDISING

•

OCTOBER 15, 1951
VOLUME 40 NUMBER 21

Contents

Contents of previous issues can be found by consulting the Industrial Arts Index and the Engineering Index, Inc. at your library.

• **Special Article**

A Comparison of Breaking and Bursting Strength Values with the Taber Abraser..... 661
Margaret Harris Zook and Pauline Beery Mack

• **Departments**

Abstracts 666
Book Review 687
News 687

• **Proceedings of the American Association of Textile Chemists and Colorists**

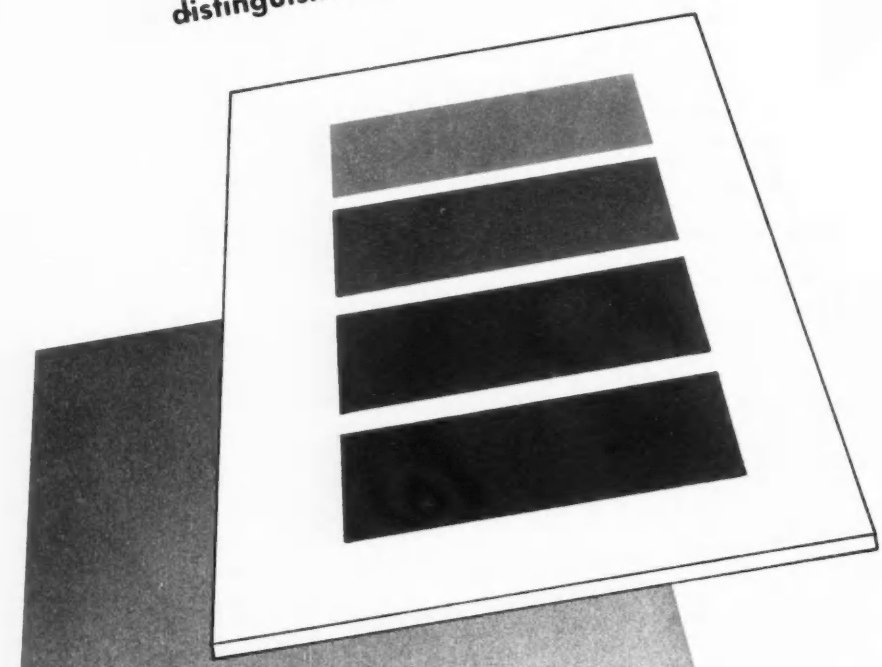
Calendar of Future Meetings.....P669
Historical Sketches of Student Paper Principals....P670
Report of New York Section Meeting.....P670
Correction P671
Report of Piedmont Section Meeting.....P671
New York Section:—
Screen Printing of Textiles.....P672
O F Habel
New York, Northern New England and Philadelphia Sections:—
Continuous Stripping of Carpet-Yarn Waste..P675
P J Wood and E T Duffy
Employment Register P680
Rhode Island Section:—
Current Trends in the Dyeing of Synthetic Fibers.P681
P J Choquette
Membership Applications P684
Philadelphia Section Meeting Report.....P686
Pacific Southwest Section Meeting Report.....P686

Copyright, 1951, Howes Publishing Co., Inc.

Shade with a place in the sun

SOLANTINE RED 6BLL

Direct cotton and rayon color distinguished for its light fastness



- **All the economy and ease of application inherent in direct dyes plus excellent Light Fastness.**
- **Does not stain acetate effect threads.**
- **Excellent value for use on dry cleanable outerwear, sports dresses, etc.**

For shade card, write, wire or phone our nearest office.

NATIONAL ANILINE DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET, NEW YORK 6, N.Y. • BOwling Green 9-2240

Boston 14, Mass., 150 Causeway St.	CApitol 7-0490	Richmond 19, Va., 8 North Fifth St.	Richmond 2-1930
Providence 3, R.I., 15 Westminster St.	DExter 1-3008	Columbus, Ga., Columbus Interstate Bldg.	Columbus 3-1029
Philadelphia 6, Pa., 200-204 S. Front St.	LOmbard 9-6382	Greensboro, N.C., Jefferson Standard Bldg.	GReensboro 2-2518
San Francisco 5, Cal., 517 Howard St.	SUtter 1-7507	Chattanooga 2, Tenn., James Building	CHattanooga 6-6347
Portland 9, Ore., 730 West Burnside St.	Beacon 1853	Atlanta 2, Ga., 140 Peachtree St.	CYPress 2021
Chicago 54, Ill., The Merchandise Mart	SUperior 7-3387	New Orleans 16, La., 714 Carondelet Building	Raymond 7228
Charlotte, 1 N.C., 201-203 West First St.	CHarlotte 3-9221	Toronto 2, Canada, 137-143 Wellington St. W.	Elgin 6495

AMERICAN
DYESTUFF REPORTER

VOLUME 40 OCTOBER 15, 1951 NUMBER 21

A COMPARISON OF BREAKING AND BURSTING STRENGTH VALUES WITH THE TABER ABRASER

MARGARET HARRIS ZOOK and PAULINE BEERY MACK

Ellen H. Richards Institute
The Pennsylvania State College

INTRODUCTION

Four abrasion and test directions for breaking strength determinations are used as the end-point for evaluating strength losses in abrasion tests with the Taber machine. These are: (1) abrasion in the warp directions with breaking strength strips cut in the direction of the abrasive action; (2) abrasion in the warp direction with the test strips cut at right angles to the direction of the abrasion; (3) abrasion in the filling direction with the breaking strength strips cut in the direction of the abrasive action; and (4) abrasion in the filling direction with the test strips cut in the opposite direction. Another possible method of evaluating strength losses resulting from abrasion presents itself, and that is the use of bursting strength, not previously reported as a measure of destruction from abrasion on the Taber Abraser.

Hamburger and Lee *(1)* have explained that, in certain articles of wearing apparel, the abrasion direction is at right angles to the yarn direction, and that therefore strength loss should be measured in that direction on lining fabrics. Havs *(2)* also has recommended this method; and Kaswell *(3)* reports using it in his study, although it was given minor importance in comparison with loss in strength from abrasion parallel to the direction of the yarns.

This report is based on a comparative study of the losses in strength obtained by means of breaking strength tests in the aforementioned four combinations of abrasion and test directions, regardless of where the greatest abrasive action may be applied in consumer wear, and by bursting strength values from three locations in the abrasion ring as defined.

This is the fifth in a series of reports on methodology studies relating to the testing of textile fabrics for resistance to abrasion, from the laboratories of the Ellen H. Richards Institute, sponsored by the American Viscose Corporation.

METHODS OF PROCEDURE

FABRICS—Twelve experimental rayon fabrics, ranging from a light-weight satin to a heavy tackletwill, as described by Zook *(4)*, and used in previous reports of this series, were employed in this study.

METHOD OF ABRASION APPLICATION—The three-wheel technique as previously explained by Zook *(4)* was repeated. Four samples were abraded to each of five or six stations, by the use of CS 10 wheels with 250 grams of pressure for the light-weight satin (Fabric Number 1), and 500 grams of pressure for all of the other 11 fabrics.

BREAKING STRENGTH TEST METHOD—Breaking strength test strips were cut in the positions shown in Figures 2 and 3 of a previous paper by Zook *(4)*,

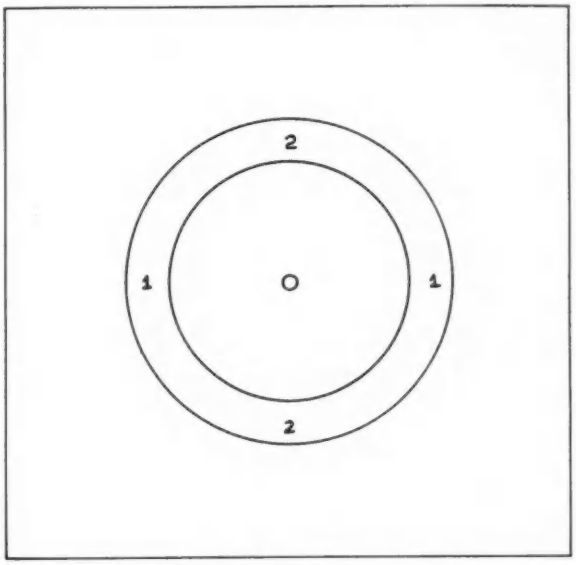


Figure 1

Location of Two Bursting Strength Tests on Samples after Abrasion with the Taber Abraser.

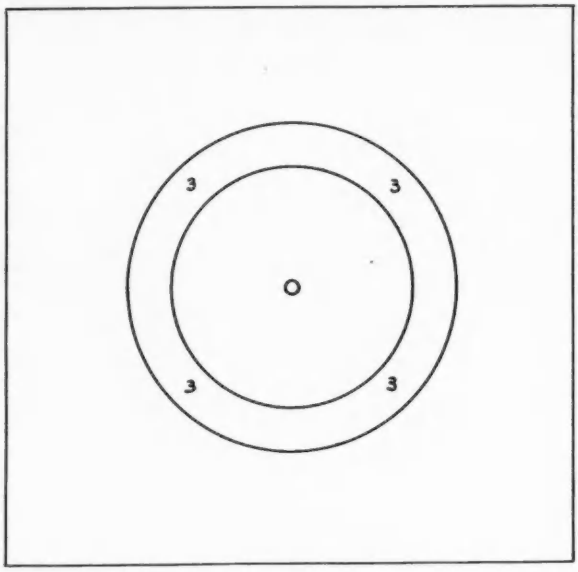


Figure 2

Location of a Third Bursting Strength on Sample after Abrasion with the Taber Abraser.

and ravelled to an exact one-half inch width. They were broken according to the ravel strip method as set forth by the American Society for Testing Materials and Commercial Standard CS59-44, at constant conditions of 70°F. and 65 per cent relative humidity.

BURSTING STRENGTH TEST METHOD—The Mullen Bursting Strength Machine Number 443 was used on four abraded test specimens in Locations (1) and (2) as shown in Figure 1. Two other abraded test specimens were given the bursting test at four points, marked Location (3) in Figure 2. Thus, eight bursts were made in each of the three defined positions. The average percentage loss at each cycle station was calculated for each location, and then the average results from the three locations were computed.

PRESENTATION OF DATA

Table I gives the initial breaking strength (warp and filling) and bursting strength average values for the 12 experimental fabrics. Table II gives the average percentage of loss at the designated abrasion cycle stations for the breaking strengths in the four combinations of abrasion and test directions, and for the three bursting strength positions.

Figure 3 shows line graphs for the four groups of breaking strength average losses for each of four combinations of yarn directions and directions of the abrasive action, together with an average of the bursting strength losses in the three prescribed positions.

DISCUSSION OF FINDINGS

COMPARISON OF BREAKING STRENGTH RESULTS WITH THE FOUR ABRASION AND TEST DIRECTION COMBINATIONS—In all cases except one, it was noted that the rupture first occurred in the warp yarns when abrasion was being applied parallel to this direction. With the red salyna (Fabric Number 9), the reverse was true. The filling yarns showed the first rupture with abrasion in the filling direction.

The breaking strength losses for each of the 12 fabrics may be summarized as follows:

Fabric Number 1 (Blue Satin)—Only the two warp directions showed noticeable strength losses. These were most exposed to abrasion by virtue of the weave. Of these, the warp yarns with the abrasion direction parallel thereto received the greatest loss.

Fabric Number 2 (Chartreuse Taffeta)—Again, the warp yarns were most exposed to abrasion by virtue of the weave of the fabric, with the result that they lost strength most rapidly. The warp yarn direction when abraded warpwise formed almost a linear breakdown which was slower at first than the breakdown shown by the warp yarns when abraded at right angles, but which reached a 100 per cent loss in strength first. Again, the filling yarns were affected less than were the warp yarns.

Fabric Number 3 (Blue Twalle)—The yarns showed a greater loss, both warpwise and fillingwise, when abraded in their direction. Losses in the warp yarns tended to be greater than in the filling yarns.

Fabric Number 4 (Pink Twalle)—Similar losses were shown in the different abrasion and test directions by the Pink Twalle as was shown by the Blue Twalle fabric.

Fabric Number 5 (Fuji)—Again, the same general relationship of strength losses was shown by the four abrasion and test directions of the Fuji fabric, although both the warp and filling yarns showed less loss in strength when abraded at right angles than was shown by the Twalle fabrics (Fabric Numbers 3 and 4).

Fabric Number 6 (Blue Gabardine)—This fabric showed an extensive breakdown in both warp direction tests; the

TABLE I

INITIAL BREAKING AND BURSTING STRENGTH VALUES OF EXPERIMENTAL FABRICS

Fabric Number	*Initial Breaking Strength (Pounds)*		*Initial Bursting Strength*
	Warp	*Filling*	
1	12.25	6.50	66.25
2	14.25	9.50	58.38
3	14.47	18.09	81.44
4	12.00	12.65	77.87
5	22.81	17.30	89.50
6	43.77	25.31	114.84
7	36.25	21.81	124.00
8	47.14	27.32	147.57
9	28.16	20.09	78.75
10	32.84	23.62	108.38
11	32.42	33.78	134.83
12	35.50	36.00	145.62

TABLE II

BREAKING STRENGTH LOSSES IN FOUR COMBINATIONS OF ABRASION AND TEST DIRECTIONS AND BURSTING STRENGTH LOSSES IN THREE POSITIONS FOLLOWING DESIGNATED ABRASION CYCLES

FABRIC NUMBER 1

CS 10 Wheels 250 grams pressure	*Breaking Strength Percentage Loss (Abraded Parallel to Yarns)*		*Breaking Strength Percentage Loss (Abraded Crosswise to Yarns)*		*Bursting Strength Percentage Loss*		
CYCLES	*Warp*	*Filling*	*Warp*	*Filling*	*Position 1*	*Position 2*	*Position 3*
25	32.6	Slight gain	39.3	6.2	36.2	37.7	35.9
50	54.4	Slight gain	39.5	8.4	51.3	57.7	57.0
75	66.1	3.0	53.4	11.8	59.6	58.5	63.4
100	77.9	Slight gain	55.7	7.9	64.5	70.9	66.8
125	92.0	3.9	64.2	6.2	65.3	78.5	66.8
150	100.0	...	83.6	9.5	63.4	75.9	69.4

FABRIC NUMBER 2

CS 10 Wheels 500 grams pressure	*Breaking Strength Percentage Loss (Abraded Parallel to Yarns)*		*Breaking Strength Percentage Loss (Abraded Crosswise to Yarns)*		*Bursting Strength Percentage Loss*		
CYCLES	*Warp*	*Filling*	*Warp*	*Filling*	*Position 1*	*Position 2*	*Position 3*
25	25.5	21.7	52.1	18.7	68.5	37.7	68.7
50	47.4	34.5	58.8	22.5	74.5	73.7	83.1
75	61.1	39.5	62.1	26.9	76.7	77.3	86.7
100	72.4	43.9	81.7	25.1	76.9	92.1	88.2
125	100.0	...	65.4	31.0	77.8	91.8	88.9
150	...	...	91.1	35.3	79.4	95.2	94.6

FABRIC NUMBER 3

CYCLES							
25	56.3	44.7	40.7	39.5	57.6	47.4	65.5
50	66.4	68.4	53.4	47.9	58.2	64.2	70.4
75	76.2	70.4	59.2	56.6	64.9	78.8	73.0
100	84.2	73.2	68.2	59.3	80.2	82.5	82.1
125	94.6	78.5	62.0	59.4	83.7	93.3	85.6
150	100.0	80.1	76.6	65.4	88.8	98.8	99.5

FABRIC NUMBER 4

CYCLES							
25	56.0	40.6	37.6	34.3	57.1	41.1	55.2
50	64.4	57.0	51.3	49.0	67.6	55.4	58.4
75	79.4	58.2	57.3	63.6	68.1	58.3	79.5
100	72.9	66.2	61.6	65.1	75.8	60.5	70.8
125	88.5	72.2	69.8	70.1	81.9	68.5	77.2
150	100.0	82.1	74.5	70.8	87.5	71.6	79.1

FABRIC NUMBER 5

CYCLES							
25	44.1	26.9	40.0	18.1	44.8	39.5	59.5
50	62.2	47.1	45.5	19.9	52.1	43.4	59.9
75	78.7	63.5	48.4	20.9	56.9	58.4	67.0
100	84.4	68.0	59.0	34.6	65.3	69.2	73.1
125	96.8	75.1	66.3	46.1	76.2	76.6	82.6
150	100.0	79.0	...	...	85.4	82.5	91.8

FABRIC NUMBER 6

CYCLES							
50	29.5	8.9	19.6	0.2	1.9	2.8	slight gain
100	43.6	9.1	36.3	2.3	10.1	3.1	2.6
150	60.9	9.5	47.2	0.3	30.6	25.4	30.6
200	79.2	8.9	63.2	0.1	39.8	31.7	37.7
250	91.1	8.9	76.4	2.1	50.1	55.4	38.8
275	100.0	14.1	82.5	4.0	52.4	75.0	60.3

FABRIC NUMBER 7

CYCLES							
50	6.4	13.0	11.6	3.6	9.0	7.7	17.4
100	17.3	25.9	16.1	5.0	38.2	34.5	38.6
150	37.0	44.5	29.2	17.2	51.8	45.0	54.7
200	61.8	48.4	51.1	17.6	57.5	66.2	63.8
250	73.6	59.5	69.7	26.6	61.3	72.0	68.2
300	83.1	75.8	72.3	37.4	65.6	78.4	71.9

FABRIC NUMBER 8

CYCLES							
100	36.0	12.2	27.7	1.5	30.0	10.4	18.6
200	53.2	13.7	38.6	11.0	47.7	35.7	52.6
300	63.1	16.6	50.1	3.8	51.0	55.2	57.7
400	80.0	17.8	60.0	4.6	50.1	70.2	58.6
500	88.1	19.2	74.1	8.0	50.6	76.5	68.0
600	93.9	28.2	78.5	9.5	57.7	77.2	63.2

FABRIC NUMBER 9

CYCLES							
50	18.9	47.7	2.1	17.3	11.4	9.5	28.3
100	26.0	71.8	10.8	23.0	14.3	18.4	39.1
150	37.2	80.3	28.4	41.9	65.4	62.4	71.1
200	45.6	91.0	36.8	60.3	85.6	80.0	85.2
250	47.2	100.0	41.5	74.3	87.8	85.9	97.9

TABLE II (CONCLUDED)

CS 10 Wheels 500 grams pressure	Breaking Strength Percentage Loss (Abraded Parallel to Yarns)		Breaking Strength Percentage Loss (Abraded Crosswise to Yarns)		Bursting Strength Percentage Loss		
CYCLES	Warp	Filling	Warp	Filling	Position 1	Position 2	Position 3
FABRIC NUMBER 10							
200	20.1	4.9	38.8	2.2	3.4	3.8	5.8
400	45.1	3.8	43.2	4.6	12.6	5.0	9.8
600	63.6	6.3	45.2	11.2	17.9	7.5	10.4
800	76.6	8.2	66.3	10.4	27.1	14.0	51.6
1,000	90.2	6.0	70.1	15.1	37.3	43.3	55.4
1,200	100.0	26.6	99.0	16.1	63.3	68.6	57.7
FABRIC NUMBER 11							
CYCLES							
200	36.9	2.0	45.6	12.5	6.1	5.8	2.7
400	50.7	3.0	55.8	18.3	16.4	7.5	9.3
600	73.2	5.6	74.2	19.3	22.6	31.3	32.6
800	89.7	4.7	80.5	17.8	35.5	61.7	41.6
1,000	100.0	13.6	98.7	21.1	53.2	60.9	53.3
FABRIC NUMBER 12							
CYCLES							
200	19.2	...	28.9	3.9	2.5	5.0	3.2
400	35.0	3.3	45.4	0.8	8.6	7.4	10.5
600	48.1	...	62.3	2.9	19.6	24.1	31.2
800	74.4	3.3	73.1	1.1	31.2	47.0	34.7
1,000	83.3	...	85.3	7.5	46.7	60.3	47.8
1,200	91.1	14.0	88.6	12.3	51.5	66.9	54.8

case in which the warp was abraded parallel to the warp yarns showed the greater percentage loss of the two cases.

Losses were low in both series of fillingwise abrasions.

Fabric Number 7 (Tan Gabardine)—A much different set of results was presented by the Tan Gabardine than by the Blue Gabardine (Fabric Number 6). The warp yarns, however, still showed less resistance to abrasion when being abraded in the parallel direction. The loss in breaking strength of the filling and warp yarns abraded fillingwise changed in relationship with each other.

The filling yarns abraded fillingwise lost more strength than when they were abraded at right angles.

Fabric Number 8 (Satin Lining)—Similar types of percentage loss hyperbolas were shown by the satin lining for all four abrasion and test directions, although the warp directions exhibited much greater breakdown than did the filling, particularly when abrasion was applied parallel thereto.

The filling yarns abraded in the same direction likewise showed slightly greater losses than when abraded warpwise.

Fabric Number 9 (Red Salyna)—In the case of the Red Salyna, the greatest strength losses were shown in the filling direction, as has been noted; the direction of abrasion parallel to the filling caused by far the greatest strength loss of any of the series.

Fabric Numbers 10, 11 and 12 (Tackletwills A, B, and C)—A similar relationship is shown in each direction for the breakdawn of all three Tackletwill fabrics. The original loss was greatest in the direction of abrasion crosswise to the warp. This is soon overtaken by the abrasion direction parallel to the warp yarns, which continues to cause a decrease in strength on a more steady incline. The breakdown in the filling yarns was very slight throughout, although in general it was somewhat higher when abraded at right angles to the yarn than when abraded parallel thereto.

It will be noted that the tackle twill fabrics were the most highly resistant to abrasion of any of the fabrics in the study.

General—It was noted that the strength loss in each abrasion and test direction for each fabric showed certain relationships. Fabrics on which the filling yarns constituted part of the fabric surface showed a resemblance of breakdown, usually with the warp direction losing the greatest strength when abraded parallel to the yarn and the filling next when abraded parallel to the filling or crosswise to the warp. When the filling yarn was buried, however, the abrasion direction crosswise to the warp lost strength in amounts next to the warp yarns when abraded warpwise. Moreover, the greatest strength losses occurred in the direction which ruptured first.

With the lighter weight fabrics, the curves were regular hyperbolas, with a 60 per cent loss near the point of greatest curvature, with the curve generally not showing a drastic rise after that point. With the heavier fabrics, the rate of loss tended to be well established at the 60 per cent point.

COMPARISON OF BURSTING STRENGTH RESULTS IN THE THREE POSITIONS—The average values for the three separate locations for bursting strength losses were closely similar in all cases. Where differences between the averages at any one cycle station occurred, they tended to lie within 10 per cent, a level found not to denote statistical significance.

INTER-COMPARISON OF BREAKING AND BURSTING STRENGTH RESULTS—The breaking and bursting strength graphs in Figure 3 show the inter-comparison of the two types of strength tests for the 12 experimental fabrics.

In many of the cases the composite bursting strength curve lay between the extremes of the breaking strength curve showing the greatest and that showing the least loss. Among the lighter fabrics and one of the gabardines, the bursting strength loss curve was somewhat higher than the breaking strength graphs at the intermediate cycle stations, but came within the breaking strength range of values at the higher number of abrasion cycles.

For Fabrics 6, 9, 10, 11, and 12 (one of the gabardines, the salyna, and the three Tackletwills) the bursting strength loss curve was as low as that of the lower breaking strength curves approximately through one-third of the abrasion cycle range; then the loss experienced a sharp rise and ended between the breaking strength loss extremes. Evidently the behavior of the bursting strength losses was influenced in these cases by the yarns which had not yet been abraded in the earlier number of cycles, but experienced a sharp rise which compensated for the lag, when these yarns began to yield to the abrasive action.

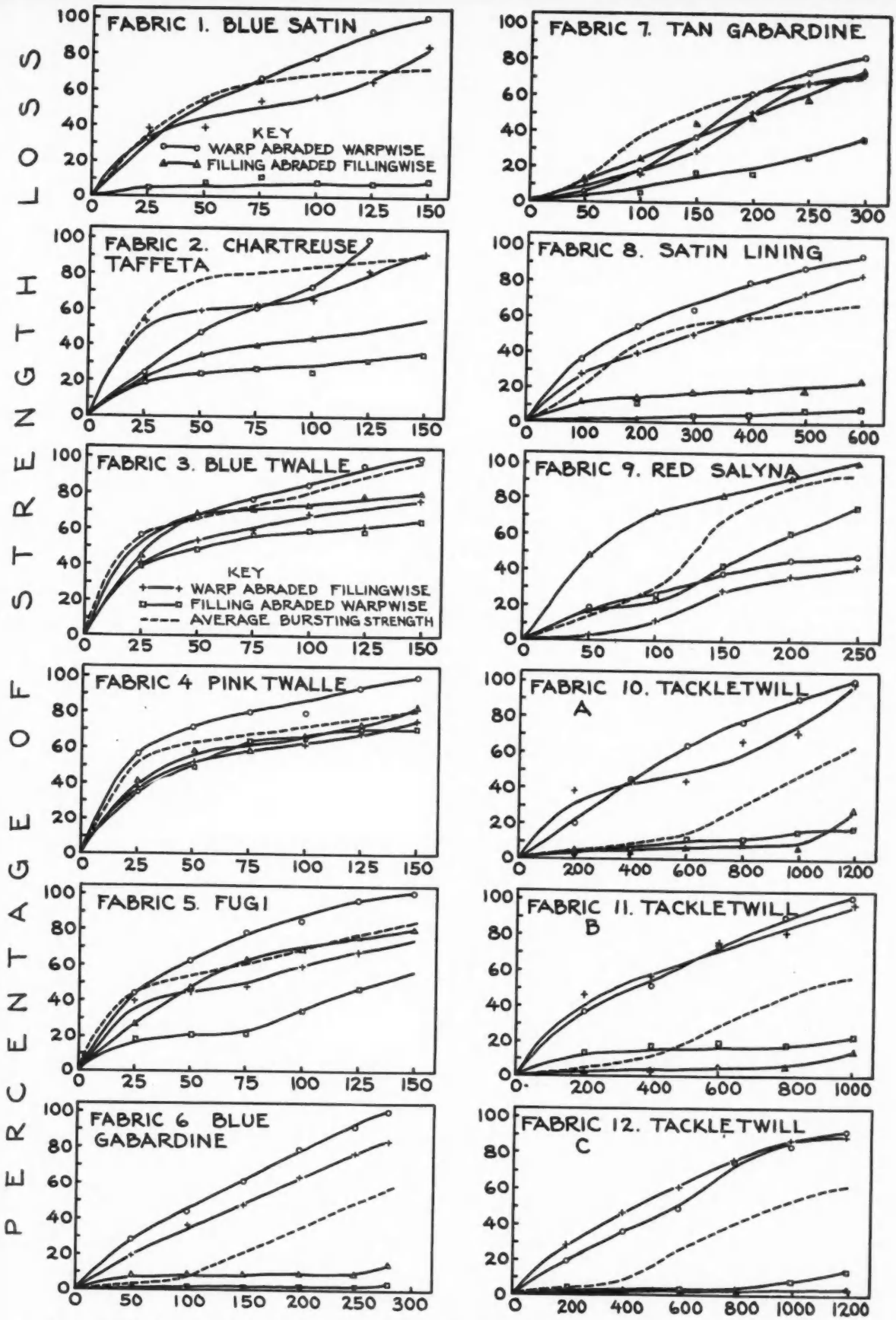


Figure 3

Comparison of Bursting and Breaking Strength Results for Experimental Fabrics. (Left) Loss in Bursting Strength at Different Locations; (Right) Loss in Breaking Strength from Four Combinations of Abrasion and Test Directions.

In general, bursting strength test results are influenced by the relative strengths both of the warp and filling yarns; the weaker yarns rupture first, which determines the breaking strength curve in that direction. Bursting strength, however, continues to be affected by the stronger yarns.

Bursting strength tests as a measure of fabric breakdown following abrasive treatment have the advantage of simplifying the strength test procedure; moreover, at the time when the fabric approaches a 100 per cent breaking strength loss from the abrasion treatments, bursting strength results tended to place fabrics essentially in the same rank order as that obtained where breaking strength values were the criterion.

SUMMARY

The relative strength losses incurred by use of the Taber Abraser in 12 representative fabrics have been studied as follows: (1) breaking strength in the warp direction abraded in the direction of the warp yarns; (2) breaking strength in the warp direction abraded at right angles to the warp direction; (3) breaking strength in the filling direction abraded in the direction of the filling yarns; (4) breaking strength in the filling direction abraded at right angles to the filling yarns; and (5) bursting strength, average of three locations in the abraded ring.

The comparative magnitude of the breaking strength losses in the respective four abrasion and test directions was affected by the position of the yarns which caused warp and filling to receive the greatest impact from the abrasive action, and by other factors.

The bursting strength results in three designated locations showed average differences from each other which were not statistically significant. Whereas the bursting strength curves lagged behind those for breaking strength at those cycle stations at which one set of yarns was behind another in responding to the abrasive action, at higher cycle stations the rate of strength loss accelerated; and, as the fabric approached 100 per cent loss, the 12 fabrics appeared essentially in the same rank order of strength loss as when breaking strength served as the criterion.

Bursting strength, not hitherto reported as a method of evaluating strength loss following this type of abrasion test, gave uniform results unquestionably related to the resistance of the fabrics to abrasion in its two combined directions. The test has the advantage of simplicity and saving in time.

Until experiments involving wearing tests of some of these same experimental fabrics (in process in this laboratory) shall have been completed, the relationship of the laboratory tests for the several breaking and bursting strength values reported herein, as a means of predicting the actual performance of fabrics in use will not be understood.

ACKNOWLEDGMENTS

The authors are indebted to the Ellen H. Richards Institute and to the American Viscose Corporation for the opportunity of being associated with the research studies on accelerated aging tests for rayon being conducted under their joint auspices.

BIBLIOGRAPHY

(1) Hamburger, W. J. and Lee, H. N. "A Study of Lining Fabric Abrasion" *Rayon Textile Monthly* 26, (1945).

(2) Hays, M. B. "Physical Properties of 26 Work Garment Fabrics" *Rayon Textile Monthly* 25, (1944).

(3) Kaswell, Ernest R. "Wear Resistance of Apparel Textiles, Parts I and II" *Textile Research J.* 16, (1946).

(4) Zook, Margaret Harris "The Development of a Reproducible Testing Technique Using the Taber Abraser on Rayon Fabrics" *Am Dyestuff Reptr* 30, 679 (1950).

ABSTRACTS

The Cuprous Ion Method of Dyeing Orlon Acrylic Fibers with Acid Dyes.

Anon, *Technical Bull* (du Pont) 7, 45-52, March, 1951.

The new Orlon staple fiber, Type 41, can be dyed with acid dyes in a bath containing a cuprous salt, e g, cuprous chloride, and an acid. However, cuprous salts are unstable even in the solid form, and only cuprous chloride is available commercially. In view of the fact that cuprous chloride exerts a very corrosive action on stainless steel, it cannot be recommended for use in commercial dyeing equipment. Fortunately, it is possible to reduce cupric salts readily to cuprous salts. Either copper sulfate or copper acetate can be reduced with Sulfoxite C or other reducing agents.

The following procedure, in which all percentages are based on the weight of the material to be dyed, has been successfully employed in the laboratory:

In a small volume in the absence of the material, the following chemicals are heated at the boil for five minutes:

10% copper sulfate
4% Sulfoxite C
1% acetic acid (glacial)
2% Duponol D Paste

The resulting suspension is added to the dyebath containing the dye and

2% Alkanol WXN

at 80°F. The material is entered and the temperature is slowly raised to the boil, whereupon

10% acetic acid (glacial)

is added over 30 minutes, and dyeing carried out at the boil for a total of 90 minutes. The dyeings are finished by scouring for 15 minutes at 160°F, using 1 g/l of Duponol D Paste.

An alternative method of dyeing consists of reducing the cupric salt with Sulfoxite C at the boil for 30 minutes as above but in the presence of the fabric.

The concentration of copper sulfate will vary with the depth of shade to be produced and with the dyestuffs selected for application.

This new method is apt to cause pitting of Type 304 stainless steel equipment. However, laboratory tests show that Type 316 stainless steel is satisfactory.

Laboratory investigation has shown that the use of 2.0 per cent paraphenylphenol in the dyebath improves the rate of exhaustion in the application of heavy shades to the Orlon acrylic fibers. Other carriers which appear to have appreciable benefit when used in 2.0 per cent strengths on the weight of the goods are phenol, benzoic acid and salicylic acid.

A table is included showing the fastness properties of a number of commercially available acid dyes applied by this method.—WHC

Lightweight Fire Resistant Treatments.

A J McQuade, *Textile Bull* 77, 73-4, June, 1951.

Through the increased use of highly combustible fuels, both in the form of weapons and in fuel for combat motive power, the danger to the individual combat soldier and his equipment from attack by fire has increased tremendously during the past ten years. As a result there has been considerable interest on the part of the Armed Forces in providing the quality of fire or flame resistance to many of the items furnished the service man.

Today most firms in the textile industry are aware of the new requirements for the lightweight fire-resistant treatment of a durable nature used in finishing fabrics for the Tent, Lightweight, Haxagonal. Light fabrics with a low increase in weight together with good crocking resistance and excellent flexing qualities highlight differences between these fabrics and the fabrics used previously in World War II.

These lighter weight fire-resistant finishes provide two distinct advantages over the antimony oxide-chlorinated hydrocarbon system that has been used previously. First, their flexibility is not impaired by subjecting the fabrics to temperatures as low as minus 60° F. In addition, their add-on weight is only 20 per cent as compared to more than 60 per cent.

These new fire-resistant fabrics have resulted from the combined effects of several factors: (a) the work carried out under research contracts at Columbia University and sponsored by the Quartermaster Corps during the period of 1943 through 1945; (b) developments from within the chemical industry; and (c) co-operation from members of the textile finishing industry in refining the application process so as to make it compatible with existing plant equipment and to include all the properties desired for military usage.

Factors worked out in processing of these fabrics with metallic oxide treatments have been numerous, and work on this type of treatment is by no means complete. In common with other fire-resistant treatments dependent upon antimony oxide, the limited availability of this chemical in times of large-scale procurements makes it desirable that substitutes or extenders should be available.

In considering the problem of fire-resistant clothing, the following requirements for the fabric and finish are to be kept in mind: (1) low increase in weight; (2) good fabric flexibility; (3) permanency of treatment to water, salt water, soaping and dry cleaning; (4) freedom from deleterious action upon storage or conditions of use; (5) good air and water vapor permeability; (6) compatibility with other finishing agents; (7) freedom from harmful effects on the skin; and (8) prevention of flame propagation and limitation of afterglow.

One property that is required for clothing purposes practically eliminates metallic oxide and antimony oxide-chlorinated hydrocarbon combinations used for tentage. Both have a basic deterrent in not providing good resistance to afterglow. There are three treatments, all involving the use of phosphates, which provide good resistance to afterglow and afterflame. As such, their glowing and flaming is limited to a period of two seconds after withdrawal of the flame source. One of these, the urea-phosphate system, is well known to many. However, its effect upon initial fabric strength and the loss in strength of such a treated fabric due to laundering have been detrimental and will reflect in poor wearing qualities.

There is a resinous nitrogen phosphate treatment which has minimized the two major defects noted for the urea-phosphate finish. However, there is still a possibility of impairing the initial strength of a cotton fabric. The wetting and drying cycles of laundering as well as the sour rinses also reduce strength during laundering. Furthermore, the tearing strength is markedly reduced, and cannot be restored to any significant extent by the use of aftertreating materials.

A third fire-resistant treatment considered as having possibilities for clothing fabric is a halogenated phosphoric acid polymer. Preliminary tests have shown fabric with this finish to be quite durable to laundering. Thus it is regarded highly as a possible approach to obtaining a suitable fire-resistant fabric. However, in its present form it is quite apparent that the means and methods for its manufacture must be simplified and thus made more economical.—WHC

The Relationship Between the Structural Geometry of a Textile Fabric and its Physical Properties. Part II: The Mechanics of Fabric Abrasion.

S Backer, *Textile Research J* 21, 453-68, July, 1951.

As a major consumer of textile materials, the Quartermaster Corps of the U S Army faced the need for improving the abrasion-resistance of fabrics used in combat clothing, thus postponing failure of the garment as a result of mechanical attrition. The Army program of research and development relating to this problem was outlined in 1945, and its connection with similar civilian research has been stressed.

The results of this work have been highly gratifying in that the fabrics developed as a part of the program were shown in controlled field tests to be from 50 to 200 per cent more durable than the standard cloth used for the fatigue garment of ground troops. In some instances blends of fibers were used with a view toward reinforcing weak points in cloth structures. In other cases, carded yarns were substituted for combed yarns, weave was modified, texture was changed, or yarn size was varied.

During the Army's extensive program on abrasion-resistance, considerable light was thrown on the role of fabric structure in the mechanism of rubbing attrition. As a result of such clarification, it is believed that the basis for the improvements referred to above can be generalized and applied in the case of other types of fabrics. The present paper discusses the geometrical aspects of fabric abrasion and points out the areas of the problem that require further investigation.

A general mechanism of cloth abrasion is proposed—one which differs from the process of surface attrition of solid bodies because of the complex geometry of fabric surfaces and the visco-elastic properties of textile fibers. The total mechanism is comprised of three elements, the relative magnitudes of which depend upon the nature of the abradant, the behavior of the fiber in the fabric structure, and the general conditions of rubbing. The three elements of abrasion are: friction, surface cutting, and fiber plucking. Friction and surface cutting cause direct damage to the fiber at local points of contact with abrasive particles. Plucking may cause immediate or dynamic fatigue rupture of the fiber at that point along the fiber length where maximum stress concentration is built up. The horizontal force developed in friction or surface cutting will also develop force components along the fiber axis and thus lead indirectly to tensile or bending rupture, which normally results from fiber plucking.

While flexural fatigue and tensile recovery properties form a striking parallel to the general abrasion-resistance of textile fibers, conditions of rubbing have been shown to nullify and even reverse expected differences between the abrasive durabilities of fibers used in experimental cloths. Thus, it is imperative that the designer of fabric structures consider the nature of the abrasion to which his material will be subjected in actual use.—WHC

Dynel Symposium.

H S Bunn, C A Setterstrom, and T A Feild, Jr, *Papers AATT* 5, 230-9, December, 1950.

Dynel, the new fiber produced by the Union Carbide and Carbon Corp, is made from 60 per cent vinyl chloride and 40 per cent acrylonitrile. Raw materials are salt, natural gas, coke, and air—all abundant and all relatively inexpensive.

In color the fiber is light cream which

can be partially bleached with sodium chlorite. It is characterized by resilience, warmth, dimensional stability, rapid drying, good dry and wet strength, resistance to fire, mildewproofness, mothproofness, and resistance to a wide variety of inorganic acids, bases, and salts. After exposure to 400 hours of Florida sun it still retained 50 per cent of its original tenacity. Under ultra-violet light it exhibits a strong white fluorescence. It is sensitive to heat, starting to shrink at temperatures above 240°F. The moisture regain is less than 0.5 per cent.

Dynel can be dyed successfully on commercial equipment with an extensive range of dyestuffs of several different types: acetate dyes, acid wool dyes, direct cotton dyes, the vats, and for brilliance, basic dyes. New methods of application for the acid and direct dyes have been developed. While the mechanisms of dyeing involved in these new methods are not fully understood it is believed that the cuprous copper employed in these dyebaths forms a chemical bond between the dyestuff molecule and the acrylonitrile molecule in the fiber to give dyeing.

Regarding fastness, with few exceptions the wash fastness of dyed Dynel is very good. The light fastness of most of the acetate dyes is fair, while in the acid and direct types it is generally much better. Fastness to perspiration and gas fading is usually very satisfactory. A tendency to develop static charges of electricity can be reduced by antistatic agents.

Finishing temperatures must not exceed 250°F except where special surface effects are desired.—WHC

Recent Progress in the Processing of Rayon and Synthetic Fibers, with Particular Reference to Developments in Dyeing Techniques.

G T Douglas, *Textile Recorder* 68, 93-4, January, 1951.

In view of the increasing appreciation of the value of textile research and the fact that progressive firms are employing more and more research workers in a study of their various textile problems, it is not surprising that in all fields of textile technology rapid progress is being made.

In so far as cellulose acetate is concerned, it has long been known that many organic solvents produce on the fiber a swelling action, by virtue of which easier penetration of dyestuffs is achieved. Generally, however, early patents restricted their scope to the use of dyestuffs which had affinity for cellulose acetate. More recently, however, very active patenting has been evident, both in Great Britain and in the USA, in swelling techniques for dyeing acetate with acid, direct, azoic, and vat dyestuffs. For example, a process has been devised for the jig dyeing of acid dyestuffs on cellulose acetate employing, after thorough prewetting of the fabric, mixed organic acids such as formic, acetic and propionic acids in the dyebath.

The greatest interest has, perhaps, been shown in the application of vat dyestuffs to cellulose acetate and to cellulosic unions containing this fiber. The material is pretreated or cotreated with a solution of an inorganic swelling agent such as ammonium, sodium or barium thiocyanate, an organic solvent of the ethyl alcohol or ethyl lactate type, and a vat dye dispersion. Later, leuco vat dyestuffs have been employed along with a lower aliphatic alcohol in low alkali content dyebaths, the caustic alkali being buffered with sodium bicarbonate. Alternatively, the caustic soda may be replaced by ammonia or triethanolamine to minimize saponification of the acetate fiber.

To protect dispersed acetate dyes from atmospheric fading due to gas fumes, there are now available a few agents which are colorless amino bodies possessing substantivity for acetate rayon from normal dyebaths, and which react preferentially with gas fumes, thus affording protection for the dyestuff. These agents are comparable in wet and dry cleaning fastness properties with the dyestuffs employed, do not affect the light fastness or alter the handle of the fabric, and thus give effective resistance throughout the full life of the fabric.

In connection with the dyeing of viscose rayon, the most notable advance is the use of the "Standfast" metal machine for the continuous application of vat dyestuffs. This machine, in which fixation of the dye previously applied to the material is effected as the fabric is run through a "U" shaped vessel containing a low-melting-point alloy, may be used for relatively short runs, a surprisingly rapid changeover from one color to another being possible.

Reference should also be made to the value of white corn dextrine, having a high alkali labile value, for the stabilization of leuco vat dyestuffs applied at high temperatures. Application by the alkaline leuco process at high temperatures brings about greening and dulling of the shades of indanthrone and halogenated indanthrones. In severe cases, the shades obtained may be grays in place of reddish blues. The addition of 5 parts of dextrine of high alkali labile value per 1000 parts of dye liquor is effective in stabilizing leuco indanthrones at 185°F for periods up to one hour, beyond which time the dextrine is itself decomposed.

In conclusion, reference should be made to a novel dyeing technique which has been evolved for the newer fibers of the superpolyamide, polyethylene, terephthalate or polyacrylonitrile types, with which dimensional stability can be achieved by a heat-setting treatment. In this method the dyestuffs are applied by padding and, after drying, a high temperature heat treatment is given which brings about fixation of the dyestuff in the synthetic fiber. Dispersed acetate and vat dyestuffs are of particular interest for this process in which temperatures of 180° to 230°C are employed for periods of a few seconds to effect fixation.—WHC

Improvement of Cotton Cloth in Resistance to Soiling and in Ease of Washing.

W P Utermohlen, M E Ryan and D O Young, *Textile Research J* 21, 510-21, July, 1951.

In recent years, interest has increased in an important practical textile problem —the treatment of cotton cloth so as to confer upon it superior resistance to soiling and/or superior ability to be cleaned by a washing process. In 1948 the U S Department of Agriculture began sponsorship of a research contract with the Institute of Textile Technology for work upon this general problem. The present paper describes the experimental work carried out during the period June 1948-August 1949. An account of some of the general aspects of the problem of soil-resistant cotton—fields of application, hypothetical means of solution, limitations of treatment, reasons for choice of experimental materials and methods, and comparisons of laboratory and end-use means of producing textile soiling—appeared in the *American Dyestuff Reporter* of April 17, 1950, and is therefore not repeated here.

Among the treatments which were applied to cotton cloth in the present study were the following: various amounts of moisture; various amounts of starch; cationic and anionic softening agents; durable and nondurable hydrophobic finishes; emulsions of prepolymerized vinyl polymers; urea and melamine-formaldehyde condensates polymerized in the cloth; and treatment such as partial acetylation or partial carboxymethylation producing chemical alterations in the cotton cellulose. The effect of these upon the action of liquid-dispersed soils for both carbon tetrachloride and aqueous pigment dispersions and upon the ease of acquisition of dry soils is discussed.

The cloth was a bleached, kiered, desized 80x80 cotton nainsook sheeting. Several different soils were used. Of the treatments employed, those which altered the electrical charge upon the cloth by introducing acidic groups appeared to have the most favorable general effect in increasing soiling resistance and ease of soil removal. A partial-acetylation treatment was noticeably effective in increasing resistance to dry soiling.—WHC

Proceedings of the
American Association of Textile Chemists and Colorists

Copyright, 1951, American Association of Textile Chemists and Colorists

OCTOBER 15, 1951

National Officers of the Association

President.....C NORRIS RABOLD, Erwin Mills Inc, Cooleemee, N C
Vice President.....J ROBERT BONNAR, General Dyestuff Corp, 435 Hudson St, New York 14, N Y
Vice President.....GEORGE O LINBERG, Belle Chemical Company, Inc, 581 Boylston St, Boston 16, Mass
Secretary.....HAROLD C CHAPIN, Lowell Textile Institute, Lowell, Mass
Treasurer.....WILLIAM R MOORHOUSE, National Aniline Division, Allied Chemical & Dye Corp, 150 Causeway St, Boston 14, Mass
Assistant Treasurer.....ALBERT E SAMPSON, National Aniline Division, Allied Chemical & Dye Corp, 150 Causeway St, Boston 14, Mass
Founder.....LOUIS A OLNEY (Deceased)
Chairman of the Research Committee.....LEONARD S LITTLE, Room 1500, 101 W 31st St, New York, N Y
Director of Research.....HAROLD W STIEGLER, Lowell Textile Institute, Lowell, Mass

Standing Committees of the Council

Executive Committee on Research.....LEONARD S LITTLE, *Chairman*
Publicity.....GEORGE H SCHULER, *Chairman*
Conventions.....KENNETH H BARNARD, *Chairman*
Appropriations.....WILLIAM R MOORHOUSE, *Chairman*
Constitution and Bylaws.....HAROLD C CHAPIN, *Chairman*
Membership and Local Sections.....GEORGE O LINBERG, *Chairman*
Corporate Membership.....GEORGE O LINBERG, *Chairman*
Publications.....PERCIVAL THEEL, *Chairman*
Technical Programs.....WILLIAM A HOLST, JR, *Chairman*

Councilors

Representing Sections

Hudson-Mohawk: ALBERT E HERRMANN, JR
Mid-West: FREDERICK E HILGER, JOSEPH H JONES
New York: CARL H BRUBAKER, RALPH M FISCHER, HERMAN E HAGER, PAUL J LUCK, HERMAN E WILDE, HENRY L YOUNG
Northern New England: EDWARD B BELL, JOHN M GOULD, FRANK J O'NEIL
Pacific Northwest: CHARLES K BISHOP
Pacific Southwest: FRANK P BRENNAN
Philadelphia: JAMES DIXON, M H KLEIN, RICHARD B STEHLE, FREDERICK V TRAUT, S GRAEME TURNBULL, JR, JACKSON A WOODRUFF
Piedmont: JOHN B NEELY, LINTON C REYNOLDS, HENRY A RUTHERFORD SUMNER H WILLIAMS
Rhode Island: EDWARD J ALLARD, RAYMOND W JACOBY, ROBERT W JOERGER, ALDEN D NUTE
South Central: GLENN R BELLAMY
Southeastern: C RUSSELL GILL, A KEMPTON HAYNES
Western New England: J EDWARD LYNN

Past Presidents

WILLIAM D APPEL, WILLIAM H CADY, CARL Z DRAVES, ALBAN EAVENSON, HENRY F HERRMANN, ELVIN H KILLHEFFER, THOMAS R SMITH, P J WOOD

Local Section Officers

HUDSON-MOHAWK

Chairman....JOHN J HANLON, Mohawk Carpet Mills, Amsterdam, N Y
Secretary.....WILLIAM A NELSON, Ritter Chemical Company, Inc, 403 W Main St, Amsterdam, N Y
Vice-Chairman—HAROLD S DAHLBERG *Treasurer*—IRWIN J SMITH

MID-WEST

Chairman.....ELLIOTT MORRILL, The Best Foods, Inc, 1436 West Morris St, Indianapolis, Ind
Secretary.....J E A SCHRODER, General Dyestuff Corp, 310 Polk St, Chicago 7, Ill
Vice-Chairman—LEONARD J ARMSTRONG *Treasurer*—H THOMPSON LATHAM

NEW YORK

Chairman.....PAUL J LUCK, Calco Chemical Division, American Cyanamid Company, 48 West 38th St, New York 18, N Y
Secretary.....NORMAN A JOHNSON, American Dyestuff Reporter, 44 East 23rd St, New York 10, N Y
Vice-Chairman—WELDON G HELMUS *Treasurer*—JAMES J MARSHALL

NORTHERN NEW ENGLAND

Chairman.....C WENDALL LEVER, Goodall-Sanford, Inc, Sanford, Maine
Secretary.....AZEL W MACK, Dexter Chemical Corp, 581 Boylston St, Boston 16, Mass
Vice-Chairman—ERNEST R KASWELL *Treasurer*—WILLIAM W PENNOCK

PACIFIC NORTHWEST

Chairman...OTTO E SCHMIDT, Pendleton Woolen Mills, Washougal, Wash
Secretary...ROBERT M TRUE, General Dyestuff Corp, 1102 Terminal Sales Bldg, Portland 5, Ore
Vice-Chairman—EDWARD J STEPHEN *Treasurer*—WILLIAM C MARSHALL

PACIFIC SOUTHWEST

Chairman....ROBERT MISHELL, Dye Masters, Inc, 363 East Beach Ave, Inglewood, Calif
Secretary....JUNE ERICSON, Home Economics Dept, University of California at Los Angeles
Vice-Chairman—ADOLPH B STONSTROM
Treasurer—JOSEPH M De La BARRE

PHILADELPHIA

Chairman.....A E RAIMO, John Campbell & Co, Inc, 2522 N Broad St, Philadelphia 32, Pa
Secretary.....THOMAS H HART, Hart Products Corp, P O Box 5025, Philadelphia 11, Pa
Vice-Chairman—EDWARD C DIEHL *Treasurer*—HARRY L MORGAN

PIEDMONT

Chairman.....R HOBART SOUTHER, Cone Mills Corporation, Denim Sta, Greensboro, N C
Secretary.....M M McCANN, Warwick Chemical Co, Burlington, N C
Vice-Chairman—J C WHITT *Treasurer*—HERMAN J JORDAN, JR

RHODE ISLAND

Chairman.....PETER G KOLUPAEV, Slatersville Finishing Co, Slatersville, R
Secretary.....ROBERT G THOMAS, Rohm & Haas Co, Inc, 2001 Industrial Trust Bldg, Providence 3, R I
Vice-Chairman—ERNEST J CHORNYEI *Treasurer*—J WILLIAM TIMPERLEY

SOUTH CENTRAL

Chairman.....WILLIAM G AGNEW, Dixie Mercerizing Co, Chattanooga, Tenn
Secretary.....EVERETT E BURGNER, Davenport Hosiery Mills, Chattanooga, Tenn
Vice-Chairman—HOWARD P LOVELESS *Treasurer*—R WILBURN FREEZE

SOUTHEASTERN

Chairman.....H GILLESPIE SMITH, Calco Chemical Division, American Cyanamid Co, Atlanta, Ga
Secretary.....HERMAN A DICKERT, A French Textile School, Georgia Institute of Technology, Atlanta, Ga
Vice-Chairman—S JACK DAVIS *Treasurer*—T HOWARD McCAMY

WESTERN NEW ENGLAND

Chairman.....RAYMOND J CAREY, General Dyestuff Corp, 435 Hudson St, New York 14, N Y
Secretary..ARTHUR S NYQUIST, American Cyanamid Co, Stamford, Conn
Vice-Chairman—OSCAR EDELSTEIN *Treasurer*—SOCRATES V VANIOTIS

Student Chapters

Bradford Durfee Technical Institute, Clemson College, Georgia Institute of Technology, Lowell Textile Institute, New Bedford Textile Institute, North Carolina State College, Philadelphia Textile Institute, Utica Technical Institute, Fairleigh Dickinson College

Calendar of Future Meetings

COUNCIL: Oct 18 (Hotel Statler, N Y); Nov 16 (Hotel New Yorker); Jan 18, 1952; April 18, 1952; June 20, 1952; Sept 19, 1952 (all in New York); Nov 6, 1952 (Boston).

GENERAL RESEARCH COMMITTEE: Dates and sites are the same as the Council's.

NATIONAL CONVENTIONS: 1951—October 17-19, Hotel Statler, New York, N Y; 1952—November 6-8, Boston, Mass; 1953—Sept 17-19, Hotel Stevens, Chicago, Ill; 1954—Atlanta, Ga.

HUDSON-MOHAWK SECTION: Oct 26 (Hotel Utica, Utica, N Y); Dec 7, Feb 1, 1952, Mar 21, 1952, May 2, 1952 (all at Jack's Restaurant); June 20, 1952 (Annual Outing).

NEW YORK SECTION: Nov 30 (Swiss Chalet); Jan 11 (Hotel New Yorker); Feb 29 (Hotel McAlpin, New York); April 18 (Swiss Chalet); May 16 (Swiss Chalet); June 20 (Outing).

NORTHERN NEW ENGLAND SECTION: Oct 26 (LTI, Lowell, Mass); Nov 30 (Annual Meeting, Boston, Mass); Jan 25 (Boston); Mar 7 (MIT); April 18 (LTI); May 16 (Andover Country Club); June 6 (Annual Outing, Merrimack Valley Country Club); Dec 6 (1952 Annual Meeting, LTI).

PACIFIC SOUTHWEST SECTION: Jan 11, 1952; March 28, 1952.

PHILADELPHIA SECTION: Oct 26, Dec 7, Jan 18, 1952 (all at Kugler's Restaurant, Philadelphia).

RHODE ISLAND SECTION: Oct 26 (Providence Engineering Society; Nov 16 (Johnston's).

SOUTH CENTRAL SECTION: Dec 1 (Hotel Patten).

SOUTHEASTERN SECTION: Dec 8 (La Grange, Ga).

WESTERN NEW ENGLAND SECTION: Nov 9, Dec 14 (both at Rapp's Restaurant, Shelton, Conn).

C Franklin Donyes (left) and Robert T Lynch will deliver the first Student Papers to be presented in conjunction with a National Convention when they address their audience at Sky Top, Hotel Statler, New York, on October 18th.

Historical Sketches of Student Paper Principals

C FRANKLIN DONYES, 1951 winner of the Student Paper Contest sponsored by the Piedmont Section, is a native of Huntington Park, California. He attended high school at Huntington Park and completed three years at Compton Junior College prior to entering the United States Navy. While in service he attained the rank of Lieutenant Commander as a pilot assigned to carrier duty. He entered North Carolina State College in June, 1948, where he received his bachelor's degree in textile chemistry and dyeing in June of this year. Mr Donyes is currently employed by Hess-Goldsmith of California, Pomona, Cal.

ROBERT J LYNCH was born in Saugus, Massachusetts, on February 6, 1922. Following his graduation from Saugus High School in 1940, he took employment with Draper Brothers Mills, Canton, Mass, and in 1941 went with Bennington Mills, Bennington, Vt. The United States Marine Corps had the call on Mr Lynch's services from March, 1942 to September, 1945. Following his tour of service he joined Wellesley Woolen Co, Newton Lower Falls, Mass. He transferred to the Hudson-Mohawk area in 1946 and spent three years with the Chalmers Knitting Company in Amsterdam, N Y, before joining his present organization, Mohawk Carpet Mills (Amsterdam) in 1949. His duties with Mohawk at present are in the Time Study Department. Mr Lynch was awarded the degree of Associate in Applied Science from the State University of Applied Arts & Sciences, Utica, N Y, on June 27th, 1951. He was married in 1947 and has one child. His chief outside interest centers around the Circle K Club, of which he is president.

—♦ ♦—

Report of New York Section Meeting

September 28, 1951
Rochelle Park, N J

A MEETING of the New York Section was held on Friday evening, September 28th, at Kohler's Swiss Chalet, Rochelle Park, New Jersey. An informal dinner preceded the meeting.

In discussing the coming convention, Charles W Dorn, Cochairman, requested members to make early reservations. John H Hennessey reported on reservations to date, Leonard S Little on the Symposium Luncheon, William A Holst on the technical program, Henry L Young on the exhibits, and Dr Herman E Hager on the ladies activities.

Paul J Luck, Section Chairman, then introduced the following speakers who took part in a discussion on "AATCC Participation in European Technical Conferences—1951";

C Norris Rabold, President of AATCC and Director of Research of the Erwin Mills, Inc—"Relationships and Responsibilities Developed";

Leonard S Little, Chairman of the AATCC General Research Committee and a Consultant—"Progress Made in International Color Fastness Standard Test Methods"; and

William D Appel, Past President of AATCC and Chief of the Textile Section of the National Bureau of Standards —"Accomplishments at the International Conferences at Bournemouth, England". Mr Appel also exhibited a number of colored slides taken in Europe.

The attendance was about 150.

Respectfully submitted,
NORMAN A JOHNSON, *Secretary*

LIST OF TEXTILE CHEMICAL SPECIALTIES FOR "1952 TECHNICAL MANUAL AND YEAR BOOK"

To Manufacturers and Importers of
Textile Chemical Specialties

30 Lahey St
New Hyde Park, N Y
Sept 30, 1951

Gentlemen:

The American Association of Textile Chemists and Colorists is again collecting material for a new "Technical Manual and Year Book", namely, for the 1952 edition. According to our new policy with respect to the List of Textile Chemical Specialties, new entries are to be accepted only every alternate year, and the next opportunity for this gratis service is now before you.

All manufacturers and importers of textile chemicals are therefore invited to prepare cards, according to directions on p 262 of the 1951 edition, for

ONLY THE FOLLOWING:

New Entries
Corrections
Deletions

Unnecessary cards, that is, cards for entries that are already correct, will be thrown away. Cards that are not made out in the proper form will be returned for correction. All that is necessary is to follow the style of presentation and the directions of the 1951 List. And please

DO NOT USE ALL CAPITAL LETTERS for names of products.

The deadline for receipt of material for the 1952 List is November 15, 1951.

Yours truly,
Carl Z Draves
For Publications Committee

CORRECTION*

"A Simplified Method for the Determination of the Oil Content of Textiles", *Am Dyestuff Reptr* 40, P30 (1951).

IN THE calculation of "F" values given in Tables II and III, an incorrect statistical formula was used. The following corrections should be made:

TABLE II

Rayon cloth	F =	11.7 instead of 3.81
Worsted top	F =	9.2 instead of 3.24
Rayon cloth	F =	12.3 instead of 3.86
Worsted top	F =	2.74 instead of 0.61

For all these samples, the 5% level of significance is 3.24; therefore, statistically, there are significant differences between laboratories in all cases except the last. However, as may be seen from Table II, these differences are due largely to the results obtained by one laboratory, and may be partially due to faulty sampling. Therefore, the data of Table III were obtained.

TABLE III

Soxhlet method,	
between laboratories	F = 0.12
Aliquot method,	
between laboratories	F = 0.67
5% level of significance	= 5.14

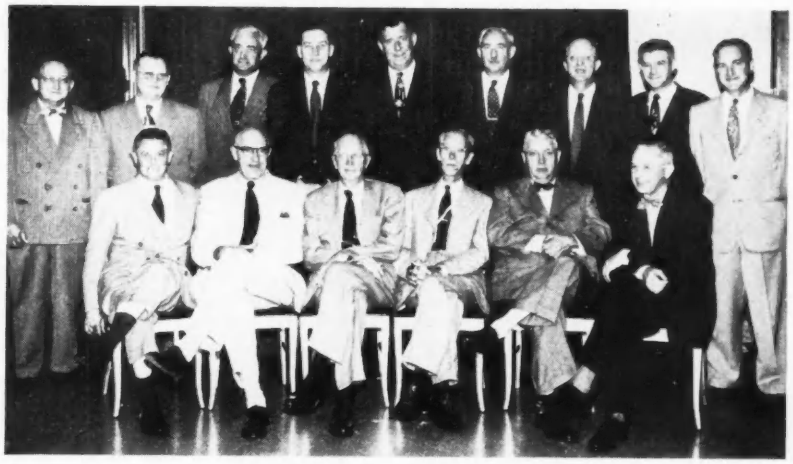
In the data of Table III, precautions were taken to obtain good sampling and care was taken that all laboratories performed the test in the same manner. Under these more carefully controlled conditions, it may be seen that there is no significant difference between laboratories, and, of course, there is no significant difference between the two methods.

Since the paper was originally given, the procedure has been made even more convenient and rapid by the use of aluminum-foil dishes costing about a cent apiece to evaporate the solvent and weigh the oil. These are so cheap that they may be discarded after use. We have also found an infrared bulb placed about six inches above the dish to be a convenient method of evaporation. No particular care is needed in evaporation since, if the samples are left too long, the oil is not "baked" and the aluminum foil is not too hot to handle.

JOHN H SKINKLE

* A communication from the author occasioned by a letter from L F Story, Acting Director if the New Zealand Woolen Mills' Research Association of Dunedin, New Zealand, in which Mr Story pointed out the errors in the "F" values. Mr Story contended in his letter at the same time that the Soxhlet method is more accurate than the quick method given by Prof Skinkle. The latter, however, cites Dickinson and Palmer, *J Textile Inst 42*, T6 (1951), to back his claim that the Soxhlet method is subject to errors of the same magnitude as his quick method and yet is much less rapid.

Piedmont Section Past Chairmen Honored



Pictured above are the past chairmen of the Piedmont Section, who were honored with suitably inscribed scrolls at the 27th Annual Section Meeting.

Seated (l to r): Dr R E Rupp, A R Thompson, R M Mitchell, H M Chase, S L Hayes and J L Crist.

Standing (l to r): R H Smith, P E Smith, W L Barker, L G Atkins, A Henry Gaede, John B Neely, T W Church, Jr, E A Briggs, and S M Cone, Jr.

Report of Piedmont Section Meeting

September 22, 1951
Hotel Charlotte, Charlotte, N C

THE ANNUAL business meeting of the Piedmont Section was held at Hotel Charlotte, Charlotte, N C, September 22, 1951.

Dr G S Turnbull, Dyestuff Division, du Pont Company, was speaker at the afternoon technical session. His subject was "Dyeing of the Newer Synthetic Fibers". This was followed by a discussion period presided over by Dr H Y Jennings of Dan River Mills.

The banquet speaker was Vice President George O Linberg who presented appropriately inscribed scrolls to all past chairmen of the Piedmont Section.

The banquet was presided over by Chairman Edward A Briggs who turned the business of the Section over to the incoming officers at the conclusion of the banquet. 210 members and guests were in attendance.

The meeting dates for the Section for 1952 will be as follows:

Feb 1 & 2—Robt E Lee Hotel, Winston-Salem, N C.

April 25 & 26—Clemson House, Clemson, S C.

June 6 & 7—Ocean Forest Hotel, Mytrle Beach, S C.

Sept 12 & 13—Hotel Charlotte, Charlotte, N C.

Respectfully submitted,
M M McCANN, *Secretary*

Retiring Chairman E A Briggs poses withthe new officers of the Piedmont Section.

(L to r): Mr Briggs; J C Whitt, vice chairman; M M McCann, secretary; R H Souther, chairman; A R Thompson, custodian; and H J Jordan, treasurer.

New York Section——

SCREEN PRINTING OF TEXTILES*

O F HABEL

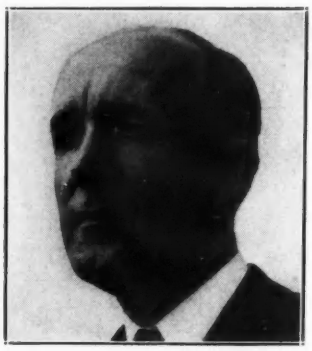
General Dyestuff Corporation

INTRODUCTION

SCREEN PRINTING as a decorative technique has become, within a relatively short period of time, a popular and well-established mode of textile printing. The reasons for its rapid growth are fairly obvious. The screen-printing method affords a convenient means of producing rather large repeats, larger than is possible within the limits of roller machine printing. As a consequence it has provided greater scope in styling, particularly in decorative fabrics. Because of its essentially manual character, with minimum crush effect, the screen printing method yields colorings of an intensity and brightness practically impossible to achieve in machine printing. Perhaps the most important feature of this method lies in the fact that the printer is able to print very short runs, runs which would be too costly to produce by machine because of the investment in engraved and plated copper shells.

EQUIPMENT

SCREENS——As to its origin, the silk-screen printing process as we know it today represents a modern adaptation of a method known as stenciling, developed and practiced to a large degree in Japan. This method consisted principally of cutting the desired pattern from paper, which was placed on top of the material to be colored. The outline of the pattern was then sprayed on the fabric. Subsequent refinement as to pattern made it necessary ot connect the various parts of the stencil, for which they used human hair. A series of modifications of this procedure later led to the painting of the desired design onto a suitable fabric stretched over a wooden frame, through which in turn the color transfer is accomplished by means of a squeegee. Obviously, for each color appearing in the pattern, a separate screen is prepared.



O F Habel

Screen printing is claimed by the author to be gaining in importance in textile printing because it can be used economically for short runs, such as for exclusive patterns, and because it can be employed for larger patterns than can be printed with the usual engraved rollers. He discusses the subject in its technical aspects, primarily dealing with equipment, print pastes and procedures. Screens, squeegees, agers, dryers and especially flash development are rather fully discussed.

Although hand-painted screens are still used to some extent where the design has no fine detail work, efforts to produce patterns with fine shade gradations have brought about the preparation of screens photographically. The original design is first traced in exact repeat onto a so-called negative; this is then reproduced photographically at the correct size onto a screen covered with a photosensitive gelatin coating. The exposure renders the gelatin on the exposed part insoluble and allows the unexposed part to be removed with water. Such gelatin-photo screens, however, possess a limited resistance to textile print pastes carrying acids or alkalies, so that it has been found necessary to reinforce this gelatin coating with a coat of acid- and alkali-resistant paint, the most reliable being the chlorinated-rubber type. Screens produced in this manner, on the whole, give excellent service, except for occasional separation of the final coat from the gelatin layer. It is this latter drawback of the gelatin screen that has brought about considerable interest in the light-sensitive coating produced with polyvinyl alcohol. According to the light source and time of exposure, the PVA solution receives an addition of ammonium bichromate as a sensitizer. The PVA thus sensitized is applied with a scraper on the screen, dried in subdued light at room temperature, and then exposed to light under a negative. The PVA coating after exposure is subjected to a prolonged treatment in an aldehyde, such as furfural or water-soluble dimethylol urea, with a catalyst, such as ammonium chloride.

The time of exposure depends on the type of light used as well as on the distance of the light from the screen. The more powerful the light, the shorter the exposure time.

It is not necessary to install elaborate lighting equipment. Ordinary electric lamps, usually 300 to 500 watts, are often used; however, mercury-vapor and carbon-arc lights also perform satisfactorily. Obviously, the sensitized screens must be kept in a dark room.

The development of the photographic screen has considerably widened the scope and extended the market of silk-screen work. New methods and procedures are constantly being tried in order to improve further the reproduction of photographic images on textile fabrics in screen printing, and we can anticipate further advances along these lines in the future.

SCREEN MATERIALS——For a long time specially woven silk, such as is used

* Presented before the New York Section in Rochelle Park, N J, on March 30, 1951.

by millers for sifting flour, known as "silk bolting cloth" of Swiss manufacture, was used exclusively for preparing the stencil. In recent years, however, both nylon and Vinyon have enjoyed increasing popularity for this purpose because of excellent resistance to the wear and tear of the print shop and to the acids and alkalies contained in print pastes. Efforts are also being made to introduce the use of finely woven phosphor-bronze gauze screens. Such screens, I may add, are used with considerable success in Europe at the present time with long life and excellent registry of design as their principal features. One must take caution, however, that bronze screens be handled with greater care so as to prevent possible denting, which, of course, may render the screen unsuitable for printing. Stretching of the frame is carried out painstakingly. Each screen in any one pattern must be stretched with the same tension. Gauze stretched entirely by hand very often shows a variation of tension. Stretching devices are now on the market that overcome this difficulty. Which type of gauze is best suited for fine work is debatable. The registry is further improved when a magnesium-aluminum alloy is used instead of wood for the screen frame. Metal frames prevent potential warping, which has been one of the chief reasons for ill-fitting patterns.

SCREEN SIZE —— The size of the screen depends upon the fabric to be printed. For 36-inch fabrics the width of the screen must be approximately 44 inches so that the screen extends at least 3 inches on each side. The length of the screen depends on the size of the repeat.

TABLES——Scren-printing tables range in length from 30 to 100 yards, are usually about 30 inches high, and can be constructed from wood, steel or concrete. The most common type is a wooden table with a good solid top fitted with register rails along one side.

The table surface is covered with wool felt of medium softness, and the felt in turn is covered with cotton as a permanent surface. Finally, prior to printing, the table is covered with what is known as "back grey", which is used to absorb the color that in many cases penetrates through the fabric to be printed and thus prevents soiling of the permanent surface. Usually the fabric to be printed is pinned onto the back grey. However, this pinning, being rather time consuming and also responsible in some degree for poor fitting designs and for screen damage, has, in many plants, been replaced by the adhesive method. In this instance a uniform layer of tacky wax is applied to the entire table top as an adhesive for the superimposed print cloth. The type of wax used varies to a great extent, although certain fundamental properties cannot be ignored. The tackiness of the wax must be sufficient to insure thorough adhesion of the print cloth to the table, and yet the wax must not be so adhesive as to be picked up by the print cloth since that would present difficulties during the washing operation. It is also necessary to consider changes in atmospheric condtions in selecting a wax. For instance, during the summer months, waxes possessing higher melting points have to be used. The wax is applied to the table top from a specially constructed carriage, consisting essentially of two copper tubes. The copper tubes, electrically heated, are constructed side by side to form a heated trough through which a very thin layer of the melted wax passes onto the table top.

The fastening of the print cloth to the table by means of an adhesive has the advantage that it prevents shrinkage of the cloth during the printing operation and in this way allows a very fine register. Waxed tables can be cleaned relatively easily with a cloth saturated with water containing a detergent. Specially designed machines greatly facilitate this operation.

Not all types of textile fabrics should be printed on waxed tables. For instance, light constructions, such as voiles or very loosely woven fabrics, are sufficiently porous to permit passage of the applied print-paste through the print cloth and thus excessive soiling of the wax.

SQUEEGEES——The actual printing is done by either one or two operators. In the case of relatively narrow fabrics one operator is sufficient; and for wider patterns, two are required, one on each side of the table. The squeegee, required for spreading the print paste within the screen frame, is usually made of hard rubber, wood, or magnesium; and, with two operators, it is passed over from one to the other. It is, of course, very important that the same pressure be applied by both printers to assure uniform results. Squeegees are being made which can be worked by means of long handles, and they enable one man to do the printing on wide tables where normally two men are needed. Most printers, however, prefer the two-man operation.

The type of design determines the type of squeegee required to insure best results. Fine-line patterns on light-weight fabrics are best printed with a fine hard-rubber squeegee about 3/16 of an inch thick. Of late, magnesium-aluminum-alloy squeegees have been used successfully for this purpose. Designs with less detail, usually printed on coarser fabrics, are best printed with a rather blunt squeegee.

One passage with the squeegee in the case of fine-line work often is sufficient, whereas with other patterns it may be necessary to give as many as 2 or 3 passages.

Attempts are constantly being made partially or completely to mechanize the screen-printing operation so as to enable the screen printer to handle roller-machine quantities without the initial capital outlay for a roller machine and without the expense of engraving copper shells and chromium plating. Some of the present screen-printing machines operate on the principle of having the fabric, previously combined with a suitable rubber sheet, move forward on an endless belt and of being printed by a series of screens arranged one next to the other along the belt. The cloth moves from screen to screen, with all the screens operating at the same time. In another type of machine the cloth moves on an endless belt with a series of screens one above the other on a rack at the end of the belt. A mechanical device places the screen on the table, at which point the operator moves the squeegee back and forth. The screen then automatically returns to the rack and the next screen will lower onto the table. The printed cloth leaving the belt is dried immediately in a continuous operation.

No doubt we will see many more schemes for the complete mechanization of screen printing as a means of approaching the productivity of roller printing.

PRINT PASTES

Among the more important factors in successful screen printing is the composition of the print paste.

THICKENING —— Aside from the proper selection of the dyestuff, a thoughtful choice of the printing carrier, or thickening, is of paramount importance to insure optimum results. The choice of thickening depends upon the following factors:

1) dyestuff group and assistant chemicals involved; the color solution may be either highly alkaline, as in the case of Rapidogen colors, or highly acid, as in the case of Diphenyl Black.
2) cloth construction.
3) price.
4) the gum must not interfere with the diffusion of the dyestuff into the fiber during steaming.
5) the gum must not cause markoffs during aging or steaming.
6) the gum must wash out easily.

Tightly woven fabrics are best printed with gums of higher solid content to insure good levelness. If perfect penetration is required, as for handkerchief cloth,

gums of low solids are most suitable.

Because far more color is applied in screen printing than in machine printing, straight starch thickenings are seldom used since their removal from the cloth after steaming often requires special handling. Small additions of starches or starch mixtures to gums of low solids, such as gum trag, carboxymethylcellulose gums and alginates, on the other hand, often result in better color yield and sharper outline.

DRYING SCREEN-PRINTED PIECES ——Room heating is most commonly utilized for drying screen-printed pieces. However, quite often the relative humidity is raised to a degree beyond the comfort of the operators. An alternative method is to use a mobile battery of infrared lamps attached to a frame, which dries as it slowly traverses the length of the table. Heated tables are also an aid in drying, and the most efficient type utilizes an electric blanket, which can be switched on immediately after printing. In general, the problem of drying may be greatly simplified by complete dehumidification of the air.

FLASH METHOD FOR VAT DYES ——This very problem of drying was responsible for the fact that vat colors up to a few years ago found very little use in screen printing. Today, however, vat colors, which are the logical choice for prints of best all-around fastness properties, are used successfully in screen printing. The method employed for printing vat colors that has found acclaim particularly among drapery printers is known as the "flash method". This method consists principally of printing without the addition of hygroscopic agents, such as glycerine, Rongalite, and potassium carbonate, and of using either Cellapret DKN, a methyl cellulose compound, or locust bean gum as a thickening. In other words, the vat color is printed as a pigment. The thickenings used coagulate when heated or when brought into contact with alkali, and it is this behavior which prevents markoff during the subsequent chemical pad.

The absence of glycerine in a print paste facilitates complete drying, and the omission of reducing agent gives prints an unlimited stability. The fact that the unsteamed prints do not undergo any change has helped considerably to increase the popularity of this process for printing drapery fabrics. The dried prints are therefore padded with caustic soda and hydrosulfite when it becomes convenient. The wet goods are then steamed at once for approximately 20 seconds at 230-240°F, oxidized and washed.

This principle may also be successfully employed by padding the dried print with Rongalite (sodium formaldehydesulfoxylate) potash and glycerine instead of hydro and caustic, and, without intermediate drying, by aging them at 230°F for 5 to 7 minutes. If the Rongalite method is used, a tower ager is required for aging, whereas, in the former case after application of caustic and hydro in the chemical pad, a specially constructed horizontal ager is used, which does not allow the printed surface to touch any rollers during the steaming operation. The horizontal ager is best constructed of stainless steel and should be approximately 25 ft in length. Live steam is introduced through a perforated pipe running the length of the ager. Since a temperature of approximately 240°F is required, the common practice of submerging the perforated pipe into a water well is dispensed with. As the presence of air during the aging operation is detrimental, care must be taken to prevent suction of air into the ager during high-speed operation. This can be accomplished most easily by maintaining constant positive pressure in the ager. An indication of such positive pressure is the escape of steam through the feeding slot, as well as through the vent on the side of the ager.

It is interesting to note that with this method of application both printing and dyeing standardizations of vat colors can be satisfactorily employed.

Whereas, for the conventional aging of vat colors, the emphasis is on moist steam to accomplish optimum fixation, the flash method requires dry steam since the necessary moisture is introduced into the cloth during the chemical padding. A web pickup of approximately 85 to 90% on weight of fiber yields best results. Excessive moisture interferes with the proper diffusion of vat leuco and causes feathering and reduced print strength.

Although the risk of markoff during the padding operation is reduced to a minimum with this method, care must be exercised to avoid markoff with very dark shades during the oxidation and washing of prints. Small additions of urea-formaldehyde resins to the print paste in some cases have been helpful. Such additions, on the other hand, may interfere with the proper diffusion of the leuco compounds, and prints may exhibit inferior fastness to crocking. A series of water sprays, as well as the use of a counter-rotating nylon brush with a water spray affixed to the first set of squeeze rollers on the open soaper, usually is most effective in eliminating the possibility of markoff. Otherwise, the finishing of prints produced by the flash method proceeds much in the same manner as for vat prints produced in the normal manner.

Except for vat dyes and azoic combinations, most colors require a prolonged steaming, for which purpose the cottage steamer or so-called "star steamer" are used. Good steaming conditions are of great importance since it is quite possible to ruin the print completely during the steaming operation.

The continuous ager as used for machine-printed goods is not always suitable since the risk of marking off is far greater with screen-printed goods than with machine prints because of the fact that in screen printing much more color is applied to the cloth.

For continuous steaming, the aforementioned tower ager is being used. This ager, often 25-30 ft high, is constructed in such a manner that it has only one roller on the inside over which the print runs face up.

The finishing of prints after steaming is done much in the same manner as for machine-printed goods except, perhaps, for the soaping. Screen-printed material often has to be soaped in rope form, whereas machine-printed goods in most cases may be soaped satisfactorily on an open washer.

With the many improvements in screen-printing technique achieved particularly over the past 10 to 15 years, there has been an increased demand for screen-printed textiles, so that today screen printing represents a big industry and, as such, faces problems much like other enterprises. The screen printer has been able to overcome many of the difficulties that have made his life adventurous. In the future, because he will no doubt continue to improve quality and to reduce relative costs, he should enjoy an ever-increasing volume of business.

In this talk I have attempted to cover the principal features of the screen-printing process. No doubt there are refinements and details which you would like to discuss during the question period. I have a number of screen-printed swatches with me, illustrating many of the features of this technique, which are available for your inspection.

QUESTIONS

Q: Have pigment dyes been used for screen printing?

A: Yes, especially water emulsions of pigments have been successfully employed, but mostly on a small scale. Oil-in-water emulsions containing pigments are now creating interest as they have the great advantage of being easily cleaned off the screens.

Q: You say goods in a horizontal ager do not touch any rollers. Do they go in one end and out the other?

A: Yes, through narrow slots on either end.

New York, Northern New England and Philadelphia Sections——

CONTINUOUS STRIPPING OF CARPET-YARN WASTE*

P J WOOD and E T DUFFY†
Royce Chemical Company

INTRODUCTION

WOOL STRIPPING——In the regular wool dyehouse, goods are stripped for three reasons:

1) Incorrect shade,
2) Uneven dyeing,
3) Different color desired on already-dyed goods because of change of season or style.

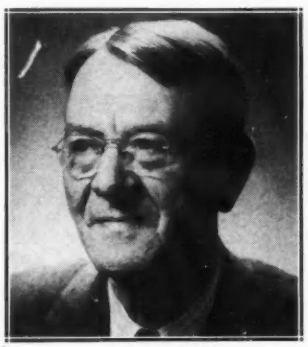
In the manufacturing of reworked wool for subsequent manufacture into serviceable cloth, the operation of stripping is carried out at one of the three following stages:

a) Rags or tailors' clippings,
b) Garnetted stock,
c) Piece goods manufactured from these materials.

In the regular wool dyehouse, the dyer is aware of the nature of the dyestuffs originally used in the dyeing and, generally, of the reaction of these dyed colors to stripping agents.

In the case of goods dyed with acid colors, especially those dyed in a strongly acid bath, incorrectly or unevenly dyed colors can frequently be sufficiently reduced in color strength and leveled by boiling for thirty to forty-five minutes in a Glauber-salt bath without acid addition. When the shade is sufficiently reduced in depth, it can be brought back to shade by careful addition of acid and dyestuff. If further reduction is necessary, this can be effected by treating with a weak ammonia or soda ash solution in a fresh bath at 115-125°F for half an hour, washing well and redyeing.

Where a complete change of shade is required, stripping to the approximation of white is necessary, and the goods must be stripped. Not all acid colors are removable by either or both of these methods; some acid colors are simply not strippable. Generally speaking, the chrome colors and shades dyed with the metallized colors are much more difficult to remove. Many of the resultant stripped shades are far from white and can only be redyed into a narrow range of shades. Frequently this stripped color bears no resemblance to the original shade, a blue stripping to a pink or reddish residue, red to a greenish tint and purple to a tan or fawn shade.



P J Wood

The authors describe the development of a continuous method for stripping color from wool-carpet-yarn waste on a plant scale in a commercial wool-scouring machine. The new continuous method gives a great saving in time and chemicals over batch methods in a Hussong machine with equal stripping effect.

The new method was based on laboratory experiments, which showed that the best stripping is obtained by a first treatment of colored wool with a 4% solution of soda ash at 125°F. After the stock is rinsed, it is then stripped further in two successive hot solutions containing zinc formaldehyde sulfoxylate and acetic acid.

By checking the stripping characteristics of his dyes, it is sometimes possible for the regular wool dyer to replace some of the dyestuffs that are difficult or impossible to strip with other dyes that are easy to strip, but which have all the other fastness properties required. On the other hand, the reworked wool manufacturer or dyer does not know what colors have been used in dyeing the rags, garnetted stock or piece goods that he is called upon to handle, so, almost invariably, he must strip the goods. The mixed stock may be dyed with a variety of types of dyestuffs, which complicates the stripping problem.

During the course of extensive experimenting with the stripping of all kinds of wool fibers, yarns and fabrics, we have found that the best method of handling the problem is as follows:

1) Treat the goods for 30 minutes with 4% of soda ash on weight of fiber (owf) at 125°F. Wash well.
2) Heat fresh water to 125°F, add 3% acetic acid, 56%, owf, work a few minutes to disperse the acid through the liquor and the goods, then scatter into the bath 3% of zinc sulfoxylate formaldehyde. Raise to boil in 20 minutes and boil 30 minutes. Wash well.

Sometimes the soda-ash bath is exceedingly dark, in which case it may be advisable to repeat the soda-bath operation. It should be remembered that the removal of any color by this means results in saving of the more expensive sulfoxylate. We have seen cases where excessive amounts of sulfoxylate have been used and the final strip was not nearly so complete as that produced by the soda treatment and a stripping in which normal amount of sulfoxylate was used.

At other times, there does not appear to be much color, if any, removed by the soda treatment, but, particularly in the case of rags and garnetted stock, it does undoubtedly remove a great deal of oil, grease and dirt, the elimination of which facilitates the action of the stripping agent. For these reasons, we recommend it.

Some people may question the wisdom of this soda treatment as the popular conception is that all alkalies are destructive to wool at all temperatures. Harrison *(1)* tested the effect of alkaline reagents on wool and found that, at a temperature of 49°C (120.2°F) and at an alkalinity not exceeding pH 12, all alkalies are harmless. However, Harrison carried out his experiments on raw wool, containing all the wool sweat and wool grease, which act as excellent buffering agents; these findings would not apply on reworked wool. Nevertheless, Milton Harris *(2)*,

* Presented by P J Wood at Rochelle Park, N J, before the New York Section on November 17, 1950, before the Northern New England Section at Cambridge on March 9, 1951, and before the Philadelphia Section on March 16, 1951.

† Now associated with the Manhattan Shirt Co, Paterson, N J.

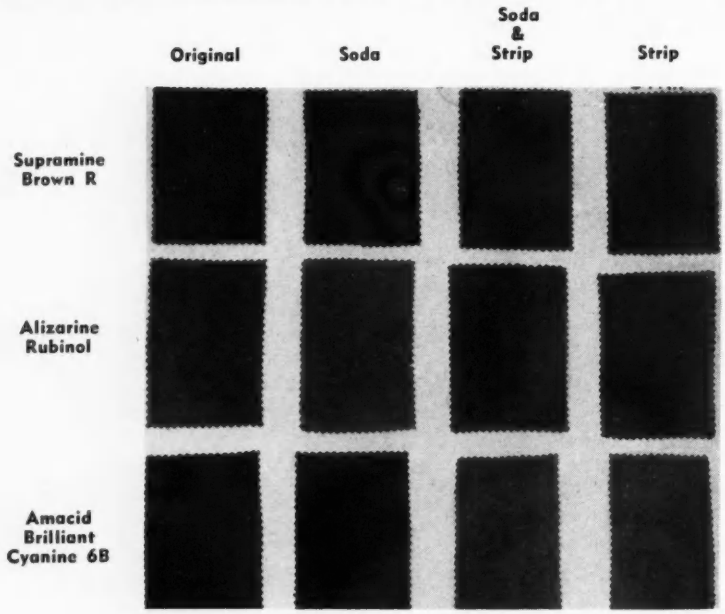


Figure 1
Behavior of Different Dyes Upon Stripping and Advantage of Prestrip with Soda Ash

using washed and extracted wool yarn, treated the wool with various alkaline solutions at 125°F for 30 minutes and found that solutions containing less than 4 grams of soda ash per liter had very little effect on the tensile strength of wool. Gerstner *(3)* confirms this statement, pointing out that, at the rate of 5% of soda ash owf and at a water to wool ratio of 20:1, the strength of the soda solution would be only 2.5 grams per liter, much below the standard established by Harris as a safe limit of alkalinity.

At this point it may be well to define what is meant by wool damage. In the book review in the October 1950 number of the *Journal of the Society of Dyers & Colourists* is this abstract from a book *The Examination of Damage in Wool*, "Wool is damaged if the amount of damage is so much higher than the usual percentage for that particular type of wool that the serviceability is impaired or undesirable effects are encountered, either during the later stages of the manufacturing process or during the actual use of the finished goods".

In Figures 1 and 2 are half a dozen colors chosen from many that we have stripped. These are dyed with dyestuffs that are commonly used in wool dyeing, many of them in dyeing stock for spinning into carpet yarn. These samples show colors that are easily stripped, colors that are difficult to strip and colors that are not strippable. These two figures also illustrate the helpfulness of the soda-ash treatment before stripping and the economy of stripping agent resulting from the use of this pretreatment.

In the first column of the figure are shown the original dyed colors; in the second column are the same colors after the soda treatment; in the third column are the soda-treated colors stripped with 2% of the stripping agent; the fourth column shows the original color, without soda pretreatment, stripped with 3% of the stripping agent. Examination of these samples reveals that, in the majority of cases, the soda pretreatment plus 2% stripping agent is equal to, or superior to, that made without soda and with 50% more stripping agent. As mentioned previously, the soda treatment of waste, even if it does not remove a great deal of color, at least eliminates the oils used during the garnetting of the waste.

From these exhibits, it will be recognized that the stripping of colors on wool is not so much a matter of the method employed, as it is of the strippability of the individual colors used in dyeing. There is no magic stripper that will reduce all colors to a white ground. The final result, even in the case of the so-called easy-stripping colors, is somewhat variable, final colors from a fairly good white through ivory, cream to a light tan or ecru being obtained. Those dyeings that are more difficult to strip may turn out a lighter shade of the original color as in the samples shown of the Rubinol and the Cyanine 6B, or an entirely different

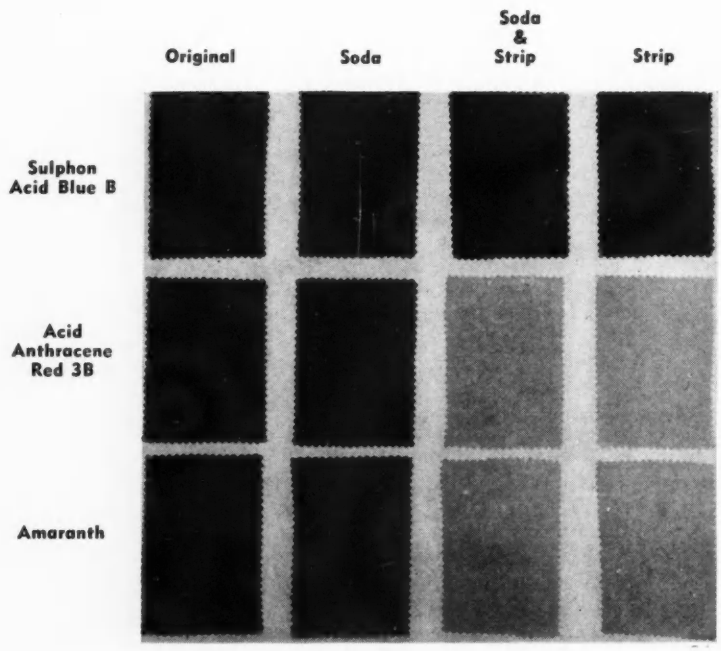


Figure 2
Behavior of Different Dyes Upon Stripping and Advantage of Prestrip with Soda Ash

shade as in the case of the Brown R.

Cyanine 6B, on being removed from the stripping bath, is almost white, but the residue of reduced color remaining quickly reoxidizes to a light blue on washing. As the amount of color removed by the soda pretreatment was considerable, it is possible that a second soda treatment in a fresh bath might be effective in giving a still lighter end color on stripping.

Figure 3 shows the results of stripping experiments made on yarn dyed in four of the regular shades dyed with mixtures of the dyestuffs in use in the mill in which the trials were to be made. Inspection of this exhibit reveals the varying strippability of the colors, those in which the blue ingredient predominates being more difficult to strip. This figure also illustrates the value of the soda pretreatment, in spite of the fact that very little reduction in depth of shade is perceptible on the samples in the second column treated with soda alone, as the samples in the third column treated with soda plus a 2% concentration of strip are equal to, or better than, those in the fourth column, which were stripped without a soda pretreatment but with 3% of strip.

Although chrome colors are not generally used in dyeing stock for spinning carpet yarn, and as reference has been made earlier in this paper to the greater difficulty of stripping this class of colors, it may not be amiss to show Figure 4, which illustrates the stripping of three typical after-chrome colors. The quantity of color removed by the soda pretreatment was fair in the case of the yellow and practically nil in the other two colors. These samples show a great difference in the hues of the stripped colors as compared with the original colors.

A study of the stripping of chrome and other mordant colors and possibly of the metallized wool colors is contemplated by the present authors and may be the subject of a future paper, if the results are found to be sufficiently interesting.

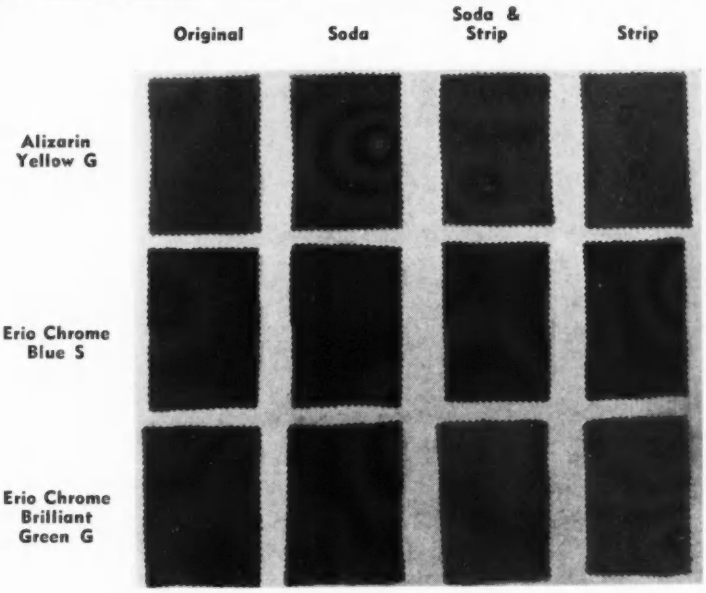


Figure 4
Laboratory Stripping Tests of Afterchromed Dyeings

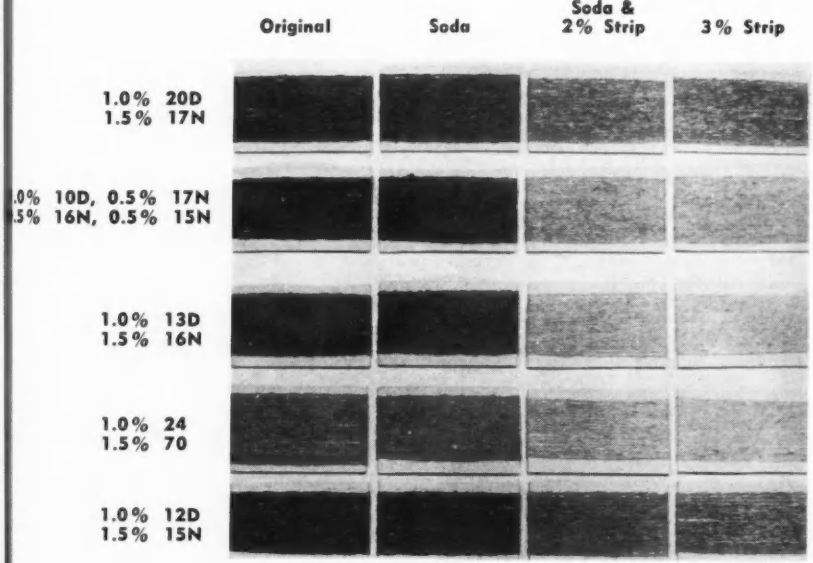


Figure 3
Stripping Tests on Yarns Dyed with Dyestuffs Employed in Mill Where Large-Scale Tests Were Made

CONTINUOUS STRIPPING

To the best of our knowledge, the stripping of all types of waste has always been carried out on a batch basis in some conventional type of wool-dyeing apparatus; we are not aware that stripping has ever been carried out continuously.

At the beginning of the year, when the management of the Beattie Manufacturing Company inquired if it would be possible to strip carpet-yarn waste continuously on the wool-scouring range, their machine was studied with regard to the way the raw wool was being fed, the capacity of the compartments, the time the goods rested in each compartment, the temperature it was possible to attain, and all other details of operation that would help to postulate a plan of operation for stripping.

LABORATORY TRIALS——Representative average samples of the stock to be stripped were obtained, and experiments were carried out to determine what quantities of zinc sulfoxylate and acetic acid would be required to give the desired result.

Three 10-gram samples were treated with 4% of soda ash owf for 30 minutes at 125°F, and each was stripped, respectively, by one of the following recipes:

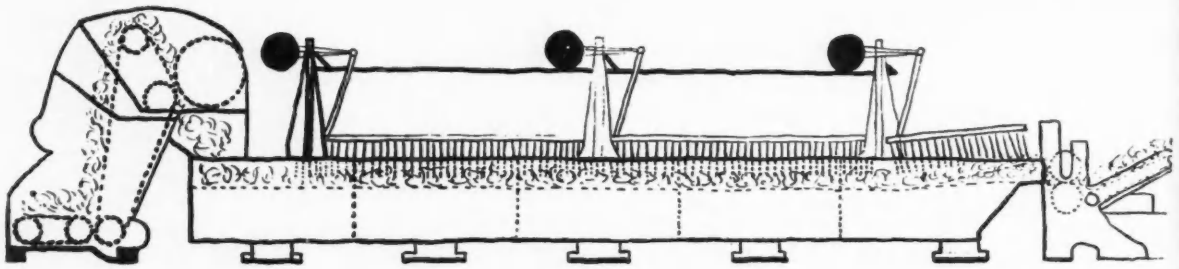


Figure 5
Scouring Bowl Used for Stripping Trials (Schematic)

1) 1% acetic acid, 56%,
   1% zinc sulfoxylate formaldehyde;
2) 2% acetic acid, 56%,
   2% zinc sulfoxylate formaldehyde;
3) 3% acetic acid, 56%,
   3% zinc sulfoxylate formaldehyde.

The acetic acid was added to the bath at 125°F, the wool was entered and worked a few minutes, and then the dry sulfoxylate was scattered into the bath. The temperature was next raised to the boil in 20 minutes, and boiling was continued for 30 minutes. The stripped waste was well washed, squeezed and dried.

Observation of the samples showed that the one stripped with 1% ZSF gave quite a good strip, that the one stripped with 2% was better, but that the sample stripped with 3% was only very slightly superior to that stripped with 2%, probably not enough better to justify the use of the additional 1% ZSF. From this experiment it appeared that the optimum quantity might be something between 1% and 2%.

It will be recognized that the method used was the conventional method mentioned earlier in this paper for batch-wise handling of stripping waste. The differences of time in the machine that would be necessary to make this system practicable were yet to be worked out.

The next experiment was made to determine if the soda pretreatment that we have found effective in reworked wool stripping would be advantageous in the continuous method. This time, an attempt was made to reproduce the continuous method in the laboratory at the goods-to-bath ratio and times that had been found necessary from our study of the wool-scouring range that was to be employed for our large-scale trials. Five beakers were each filled with 500 ml of water at the indicated temperature; chemical was added to each beaker just before wool waste. A sample of wool waste weighing 6.25 grams was introduced into beaker No 1, worked in the liquor with a glass rod for exactly 3 minutes, squeezed out and passed into beaker No 2. The stripping process was continued successively with this sample through all five baths. Then a fresh sample of wool waste was carried through the same process beginning with beaker No 1 and satisfactorily stripped even though no more chemicals had been added. The beakers contained the following:

1st: 4% soda ash at 125°F.
2nd: Water at 125°F.
3rd: 2% ZSF, 2% acetic acid at 180°F.
4th: 3% ZSF, 3% acetic acid at boil.
5th: Hot water.

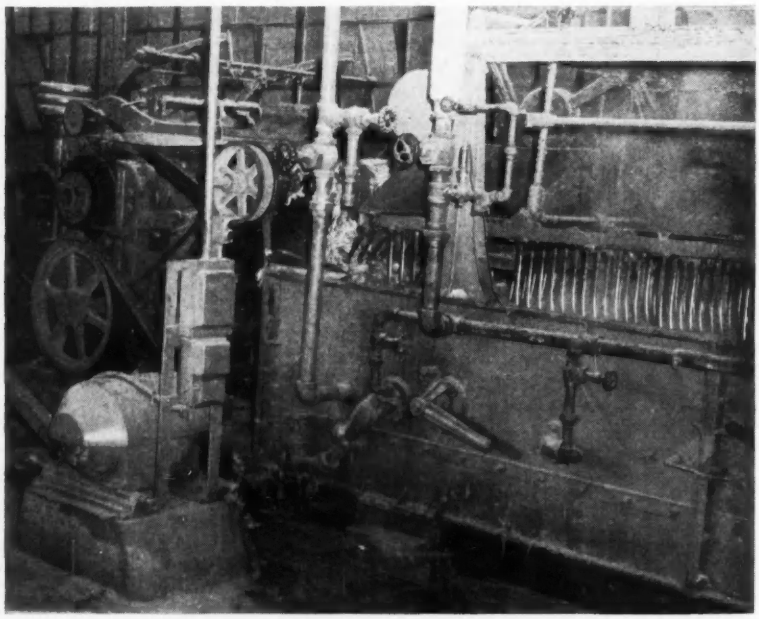


Figure 6
View of Squeezer Between Bowls of Scouring Machine Used in Mill Trials

PLANT-SCALE TRIAL

The machine consists of five bowls, each having a capacity of two thousand gallons. The stock was opened in a Schofield opener and blown into the feeder of the scouring machine, which delivered it at the prescribed speed to the first bowl.

The following initial charges of chemicals were made in the first four bowls; the fifth bowl was supplied with running water for washing after stripping.

	Chemicals		*Temperature*	
	lb	*lb*	*°F*	*pH*
Bowl				
1	8 soda ash		125	9.2
2	6 acetic	3 ZSF	190	4-5
3	3 acetic	3 ZSF	200	4-5
4	3 acetic	3 ZSF	200	4-5

The extra 3 lb of acetic acid used in bowl 2 was designed to take care of any carry-over of soda ash from bowl 1.

Waste was fed into the machine at the rate of 800 lb per hour.

At the beginning of the operation, 100 ml of the freshly made strip bath was titrated with N/10 iodine. It tested equivalent to 8.7 ml iodine soln.

After the machine had been running for ten minutes, a second titration with iodine was made. The reading was 5.5 ml of N/10 iodine solution.

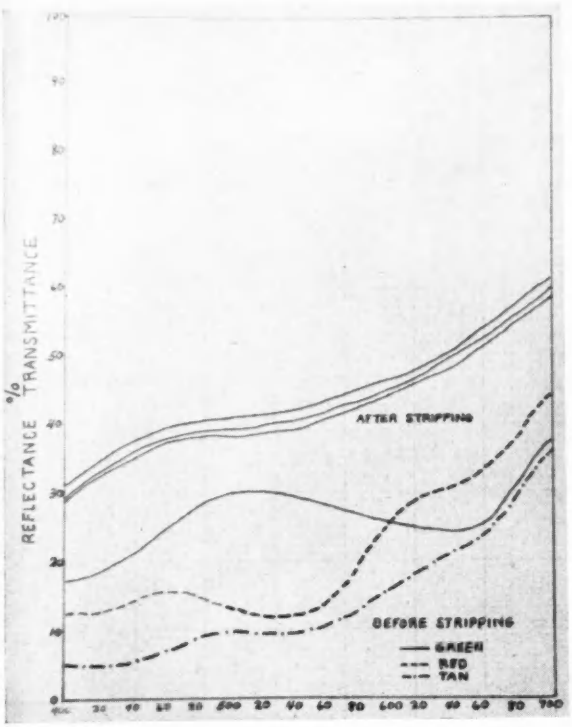


Figure 7
Reflectance Curves
Colored Wastes Before and After Continuous Stripping

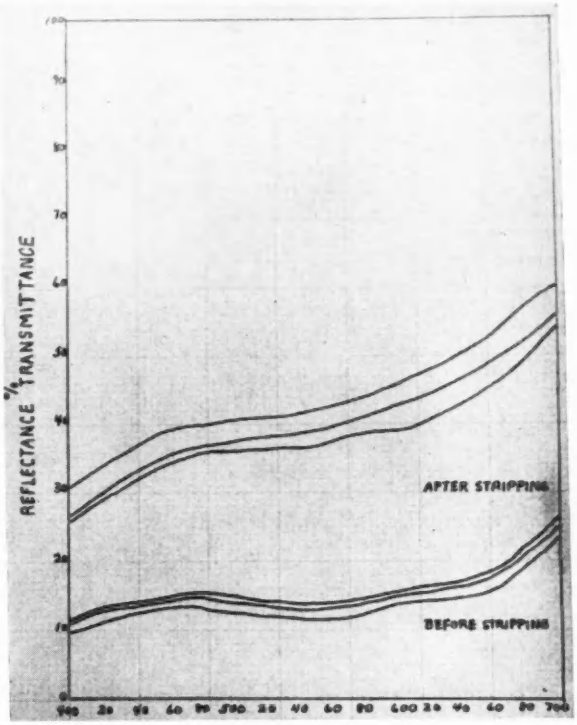


Figure 8
Reflectance Curves
Mixed Color Waste Before and After Continuous Stripping

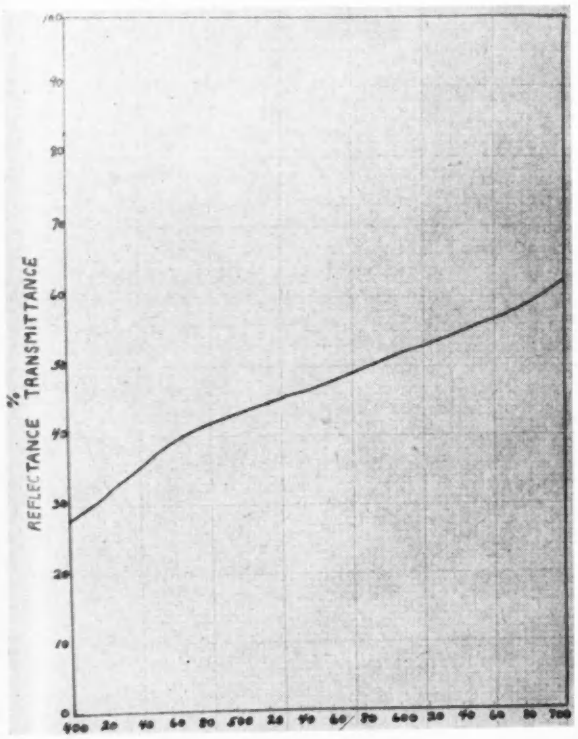


Figure 9
Reflectance Curve
Scoured (Undyed) Raw Wool

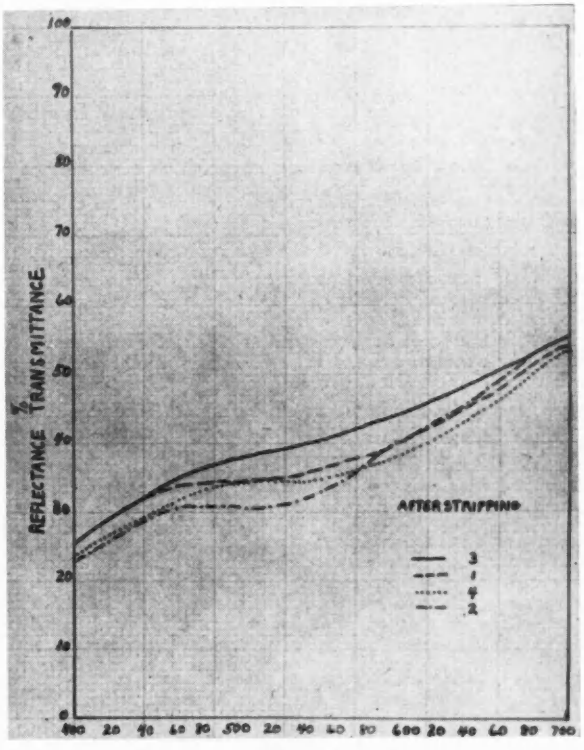


Figure 10
Reflectance Curves
Stripped Waste (Mixed Colors) During Progress of the Trials

An addition of 1 lb of acetic acid and 1 lb of ZSF was made. Titration then showed 8.3 ml of iodine soln, or approximately the same reducing potential as the original liquor.

Ten minutes later, the stripping liquor had fallen to a titration of 6 ml of iodine solution. A further addition of 1 lb of acetic acid and 1 lb of ZSF was made, bringing the liquor back to an iodine requirement of 7.2 ml.

Throughout the experiment, each time these additions of acetic acid and ZSF were made in bowls 2, 3, and 4, double the amount of acetic acid was made to bowl 2 in order to neutralize the carryover of alkali from the soda-ash liquor in bowl 1. At regular intervals the soda liquor in bowl 1 was checked, additions of soda ash being made to keep this bath as nearly as possible to its original alkalinity of pH 9.2.

It was found that, at this rate of feeding waste, uniform conditions could be approximately maintained in the three stripping bowls by additions every ten minutes as follows:

Bowl 2: 2 lb acetic, 1 lb ZSF
3: 1 lb acetic, 1 lb ZSF
4: 1 lb acetic, 1 lb ZSF

During a period of 4 hours, 3240 lb of various mixed colored-yarn waste was processed in this way. The total consumption of chemicals was as follows:

76 lb soda ash, approximately 2.3% owf,
54 lb zinc sulfoxylate formaldehyde, approx 1.66% owf,
71 lb acetic acid, 56%, approximately 2.2% owf.

The reflectance and color values of four samples, taken at random from different parts of the stripped, dried and carded waste, were recorded by means of the G E Spectrophotometer. These were compared with the results obtained by the regular intermittent-batch method of stripping in the dyeing machines. These appeared to be fully equal to the standard established. The charts show the curves as given by the spectrophotometer.

RESULTS——In all, 17,279 lb of yarn waste was processed in this way. In subsequent trials, other reducing agents were used, the results being compared with the trial as described. In all cases it was found necessary to use the equivalent amount of stripping agent corresponding to the reduction potential of the particular product used, which is practically the same as equivalent money value.

The reflectance of the stripped waste was approximately equal in all cases, as will be seen from inspection of the curves shown in Figures 7 and 8, Figure 9 showing the curve for the original scoured undyed wool.

The chemical cost in the case of the goods processed by this continuous operation was about 0.3¢ less than by the coventional batch operation in a Hussong machine.

The quantity of water used in the stripping proper was 6000 gallons in bowls 2, 3 and 4, whereas approximately 10,000 gallons would be used in batch operations on the same number of pounds of waste by the intermittent process.

No comparison of the labor cost was possible, as the feeding of chemicals was done by hand.

CONCLUSION

From these experiments it seems reasonable to assume that the continuous stripping of wool-carpet-yarn waste on the wool-scouring machine is not only practicable but economical.

In order to carry out the operation efficiently, the following recommendations seem advisable.

1) Variable speed of the machine, within a fairly narrow range.
2) Automatic control of the feeding of chemicals from stock-solution tanks: soda ash, sulfoxylate and acetic acid.

ACKNOWLEDGMENTS

Our thanks are due to the Beattie Manufacturing Company for making it possible for us to carry out these experiments in their plant and for permission to publish the results. Especially do we wish to thank Mr Robert A Posey and his staff for their valuable co-operation.

To Mr A J Berube, who ably assisted the authors in these trials, we also owe a debt of thanks.

REFERENCES

(1) *Textile World*, 85, 2247 (Nov, 1935).
(2) *Am Dyestuff Reptr*, 24, 562-567 (1935).
(3) *Monatschr Textil-Ind*, Fachheft I, 9-11 (1937).

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association. Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

51-15

Education: Equivalent of U S college, with additional graduate study; including five months in U S A.

Experience: 11 years; since 1945 as dyeing master in mill of 900 employees specializing on wool.

Age: 35; married; references; citizen of Denmark seeking position in North America, preferably southwest U S A.

10-1, 10-15

51-16

Education: M S in chemistry, with further graduate study.

Experience: Research chemist, including five years in textiles.

Age: 34; single, references; South preferred.

10-1, 10-15

51-17

Education: 2 years chemical engg; B S in chemistry and dyeing, Philadelphia Textile Institute.

Experience: 6 years; chemist and colorist, dyer and bleacher, supervisor for warp mercerizing.

Age: 34; married; references; Central Atlantic states preferred, but not essential.

10-15, 10-29

51-18

Education: B S, New York University.

Experience: export sales.

Age: 33; married; references; vicinity of New York, N Y, preferred.

10-15, 10-29

51-19

Education: Philadelphia Textile Institute, 3 years chemistry and dyeing.

Experience: superintendent of dyeing and finishing, hosiery, felt and hair.

Age: 30; married; references; vicinity of Philadelphia preferred.

10-15, 10-29

51-20

Education: B S, Bradford Durfee Technical Institute.

Experience: dyer, worsted and nylon yarns.

Age: 24; married; references; central or north Atlantic coast preferred.

10-15, 10-29

51-21

Education: B S, Georgia Institute of Technology, 1951.

Experience: textile technologist.

Age: 26; single; references; position as textile technologist or dyer trainee desired, in New England or Middle Atlantic States.

10-15, 10-29

Rhode Island Section——

CURRENT TRENDS IN THE DYEING OF SYNTHETIC FIBERS*

PAUL J CHOQUETTE

General Dyestuff Corporation

INTRODUCTION

IT IS ALWAYS a pleasure to visit Rhode Island to renew the good fellowship that I enjoyed during the days of my employment here. In discussing "Current Trends in the Dyeing of Synthetic Fibers" there will of necessity be items which may be considered repetitious. I can only hope that our discussion will open up some new angles of approach to the many problems that will influence our future dyeing technique.

A knowledge of the dyeing properties of the new synthetic fibers has become very important. The designer wishes to utilize their special physical properties as building blocks to supplement one another and to produce an improved result in terms of end use. The stylist wishes to produce special color effects. At what stage of manufacture should the fiber be dyed? The answer to these questions can only be co-ordinated through development of proper dyeing technique and equipment. Finally, these procedures are important to the dyer and finisher who wishes to plan his equipment requirements for a future that will certainly utilize an ever-increasing production of synthetic fibers. It is also important that dyeing techniques be developed simultaneously with fiber development since fibers must be colored to be converted into finished products for consumer evaluation. Improper dyeings in terms of end use may react very unfavorably on an otherwise excellent fiber.

I have a number of current trade samples here illustrating effects produced with synthetic fibers and shall discuss them as we proceed.

Paul J Choquette

Current trends in the dyeing of synthetic fibers are discussed. A procedure for the application of vats and leuco esters of vat dyes to Orlon and Dacron piece goods is outlined. High temperatures and the use of carriers for dyeing Orlon and Dacron on the package machine are explained. Methods for dyeing Vicara, Dynel and Fortisan are given.

Future trends in the development of dyeing equipment are discussed. A brief description of the new Williams fiber-processing machine is given.

DISCUSSION

VISCOSE RAYON, ACETATE AND BLENDS——With an estimated consumption for 1950 in the United States of 1,100,000,000 lb of viscose rayon and cellulose acetate, the potential of these man-made fibers continues to grow. There has been an increasing volume of spun-rayon piece goods dyed with vat colors. An increasing proportion of this work is now being dyed on the Williams-unit or pad-steam continuous ranges. Interest is also manifest in the new Standfast molten-metal process.

Selected fast-to-light direct colors that are not adversely affected by stabilizing resin finishes are extensively used for all-viscose textiles or for viscose-acetate blends. For dark shades, increasing use is being made of those direct colors whose fastness to washing and fastness to light are improved by an aftertreatment with a resin fixing agent and copper salt. One of the simplest methods for this application is to combine these chemicals with the formaldehyde resin used in finishing. The goods after being dyed are padded, dried and cured in the conventional manner.

The increasing use of acetate rayon has emphasized the importance of the application of durable finishes that give gas-fading protection. These are normally applied simultaneously with acetate dyes. Care must be taken in selecting gas-fading inhibitors for blends of viscose and acetate since certain products may adversely affect the fastness to light of the direct colors utilized for the viscose rayon. Summer-suiting blends of viscose rayon or acetate and mohair and/or wool of excellent fastness to light and to washing have been produced in light to medium shades through the use of the leucoesters of vat dyes. By this method the valuable properties of the animal fiber are conserved since it does not come into contact with alkali. The material is padded, steamed for a short period to fix the color on the animal fiber, and developed in one continuous operation. As acetate rayon is only tinted by this process, two-tone effects become feasible.

Interest continues in the use of swelling agents to improve penetration and speed in the dyeing of acetate. Such agents are utilized in plants equipped with the necessary protection against fire hazards for the application of acetate dyes and selected acid or basic dyes. Typical examples are the popular fluorescent shades on acetate *(1)*.

The demand for fast-to-washing shades on blends of viscose and acetate has also developed interest in mass dyed acetate. In this method, pigment color is introduced during the manufacture of acetate fiber to produce extremely fast shades. Yarn prepared from this colored fiber is then woven with viscose or acetate, and the resultant piece goods are dyed to obtain solid or cross-dyed effects. From the fiber manufacturer's standpoint this process is expensive because of limitations on production. The prediction of color de-

* Presented before the Rhode Island Section in the home of the Providence Engineering Society on January 26, 1951.

mand also presents a serious inventory problem. Black, together with a few other standard shades, has been the principal production. These limitations have stimulated interest in dyeing fast-to-cross-dyeing shades on acetate yarn. The Atlantic Rayon patented process produces fast-to-washing shades through the use of acid dyes and acid swelling agents. Promising results are also being obtained with naphthols, particularly for deep and bright scarlet, red, maroon, brown, navy-blue and black shades. In this case, the naphthol and dispersed base are first dyed with the aid of an assistant, and then the base is diazotized.

NYLON AND NYLON BLENDS—— One of the forward steps for the dyeing of nylon piece goods was presented in the excellent paper of the Rhode Island Section on the pad-steam dyeing method *(2)*. This concept, coupled with supplemental heat treatments, offers a great deal of promise. Apart from this method, acetate dyes continue to be the most level-dyeing on nylon. Dyes of this class have been developed with improved fastness to light. Special premetalized types of acid dyes have also been introduced to the trade. These dyes are of excellent fastness to light and are of particular interest for blends with viscose, which they leave white. Blends of cotton, viscose, and nylon are being successfully dyed continuously in good unions with selected fast-to-light direct and acid dyes by padding and steaming.

Interest in wool or worsted blended with nylon continues. The strength of the nylon permits the production of finer yarns, which in turn may be woven into lighter-weight fabrics of greater strength and durability as compared with wool alone. No single group of dyes can be recommended for wool-nylon unions for all depths of shade. Generally, acid dyes of lower sulfonation produce heavier shades on nylon than those of higher sulfonation. Shades beyond the saturation point for nylon of a particular acid dye yield poor unions, inasmuch as the wool then dyes heavier. To produce good unions in light shades it is frequently necessary to use an auxiliary of the alkylarylsulfonate type, which, because of its strong affinity for the nylon, tends to keep the dye off the nylon and permits it to go on the wool. For certain very heavy shades, level results may be obtained by dyeing the nylon with acetate dyes at 160 to 180°F in the presence of ammonia, which assists in keeping the dye off the wool. The wool is then brought up to shade with premetalized or acid dyes. The final fastness is satisfactory since the shades are equivalent to those obtained with acid dyes alone, which are normally used on all-wool ladies' wear. Selected premetalized dyes produce good unions in many shades. Nylon Resist GDC by blocking the active amino groups in the nylon prevents selected acid, chrome and premetalized dyes from dyeing the nylon. This product is fast to cross-dyeing, so that wool may be dyed to leave the nylon white. Colored nylon stripes can also be produced if the nylon is first dyed prior to application of the resist. Interesting cross-dyes may also be produced in this manner in blends with viscose. In this case direct colors are used for the rayon.

VICARA AND VICARA BLENDS—— Vicara is a protein fiber produced from zein (protein from corn) by the Virginia Carolina Chemical Co. This fiber improves the handle or feel of cotton or rayon and does not decrease warmth when blended with wool. It gives absorbency to nylon. Vicara is currently appearing on the market in suiting or dress goods blended with viscose rayon, viscose and acetate, wool or worsted. It is also blended with wool for knitting yarns and with cotton or nylon for hosiery. Selected level dyeing acid and chrome colors yield good results on Vicara and on blends with wool. These dyes meet most end-use requirements. This selection of acid and chrome dyes is important, inasmuch as the affinity of many of these dyes for Vicara varies and poor unions with wool may result. Selected premetalized acid dyes also yield satisfactory unions on wool-Vicara and nylon-Vicara blends in medium to dark shades. Light shades offer more difficulty because of the natural yellow color of the Vicara. For bright pinks and blues it is first necessary to bleach the Vicara. Satisfactory bleaches have been obtained on 50-50 wool-Vicara by treatment for 7 hours at 120°F with hydrogen peroxide adjusted to a pH of 8.5 with tetrasodium pyrophosphate and ammonia. In the case of 100% Vicara, which is more resistant to alkali than wool, more rapid bleaching can be utilized. A treatment with sulfurous acid at the boil, followed by rinsing, neutralizing and peroxide bleaching at 200 to 212°F for 45 minutes in a bath made alkaline with sodium silicate, is considered satisfactory. After a further rinsing, the white may be improved still more by treatment in a fresh bath with 0.25% (owf) of an optical white, such as Blancophor AW High Conc, and 3% formic acid, 85% (owf) at 160°F for 30 minutes.

Piece-goods blends of Vicara and viscose may be dyed with vats or with leuco-esters of vat dyes by conventional methods. Fast-to-light direct and acid dyes may also be utilized. For blends of viscose, acetate and Vicara, acetate dyes must be used for the acetate component. As these dyes have considerable affinity for Vicara, it is necessary to allow for this in the formulations. Moreover, these dyes, in general, are not so fast to light on Vicara and may affect the fastness of the union. This is overcome to a certain extent by selecting the most suitable acetate dyes. Dyeing is carried out at 180-200°F with direct and acetate dyes, the Vicara being brought up to shade with selected acid dyes.

For Vicara top or raw stock, which must be dyed to possess maximum fastness to cross-dyeing, vat dyes may be used. Helindon vat dyes have better affinity for Vicara than anthraquinone types. This has been found to be the case on a comparative basis even in the presence of higher amounts of caustic soda and higher temperatures, which are permissible for Vicara because of its better resistance to alkali as compared with wool. Dark shades of excellent fastness have been produced by the regular Helindon method. The conventional procedure was utilized with the exception of a few dyes, for which it was found that a slight increase of the caustic soda concentration and of the dyeing temperature to 160°F increased color yield.

DYNEL AND DYNEL BLENDS—— Dynel is a staple fiber spun from a copolymer of acrylonitrile and vinyl chloride. It is made by Union Carbide and Carbon Corp. Dynel is warm to the touch, has high resiliency, dimensional stability and resistance to combustion. High temperatures favor absorption of color by this fiber. A minimum of 205°F is required for the application of acetate dyes. For medium to heavy shades wtih acid dyes, dyeing is carried out at the boil at a pH of 6.0 with the assistance of 2.25% of paraphenylphenol (owf) as a swelling agent and 0.1 to 0.2% of cuprous copper salt (owf) as a mordant *(3)*. The cuprous copper salt is produced during the dyeing cycle by reduction of cupric acetate with zinc formaldehyde hydrosulphite (about 0.4 part per 1.0 part of cupric acetate). Selected colors must be utilized in all cases inasmuch as the affinity and fastness properties vary with the individual dyes. After being dyed, Dynel must be relustered to enhance the shade and stabilize the material. Dry heat at 240°F for 15 minutes has been utilized for this purpose. Recent work would indicate that this process may be carried out on material in the wet state as a part of the dyeing operation or as an aftertreatment. For acid dyeings a treatment at the boil for 15 minutes in a 6% solution of sodium chloride (temp 215 to 220°F) was found equivalent to dry-heat relustering. In the case of acetate

dyes an addition of 10 to 20% of sodium chloride (owf) during the last stages of dyeing increases color value in certain cases and offers promise of accomplishing relustering. Most Dynel material should be treated with an antistatic agent prior to finishing since it is very prone to develop static electricity. In general it is advisable to dye Dynel separately from wool for blending of these fibers. In union dyeing with acid dyestuffs the wool of a wool-Dynel blend takes up most of the color. Vat colors may be applied to Dynel piece goods by a modified print method. Good fastness to washing and to light in dark shades may be obtained, but fastness to crocking is poor. For lighter shades the leuco esters of vat dyes may be applied by the conventional nitrite method. Apart from the fading of the natural yellow color of the fiber, such shades are fast to light and quite good to washing. Fastness to crocking remains a problem to be solved. Fading of the natural color of Dynel on exposure to light may be counteracted to a certain extent through the use of optical bleaches.

FILAMENT ORLON, SPUN ORLON AND CHEMSTRAND——Orlon is an acrylonitrile fiber made by Dupont. It has created a great deal of interest in the textile trade because of its strength, warmth and hand. It is currently appearing on the market as filament Orlon, fiberstock, which is cut filament, and spun Orlon, which contains in addition to the acrylonitrile a copolymer that gives the fiber affinity for acid dyestuffs.

Filament Orlon when dyed by conventional methods has little affinity for dyestuff. For this reason it has been used effectively as an effect thread. The leuco esters of vat dyes may be applied to piece goods by the conventional nitrite method to yield shades of good fastness to light and moderately good fastness to washing. Acetate dyestuffs applied at the boil may meet the requirements of the very light shades used for lingerie. Medium shades of good fastness to washing and to light have been produced by padding selected vat acids, drying, and heat setting at 350°F for 1 minute. Oxidation, if not complete, may be carried out as an auxiliary step, together with soaping and aftertreatments to improve the fastness to crocking. Care must be taken in applying heat to Orlon for it will yellow with excessive heat. This yellow will bleach on exposure to light and thus affect the apparent fastness to light.

Dark shades are best dyed with indigoid and thioindigoid vat dyes in a package machine equipped to operate at temperatures of 250 to 270°F. Shades of good fastness to washing and to light are obtained. Fiberstock, while having somewhat better affinity for dye than filament Orlon, is also best dyed at temperatures of 250°F.

Staple Orlon (A-3 type) is still in the pilot-plant stage, but sample work is proceeding in the trade. Bulking power, warmth and recovery from wrinkling are properties that recommend it for such end uses as suitings and sportswear. Selected acid and top-chrome dyes yield good results on this fiber. Dyeing is carried out at the boil with 4% of sulfuric acid, 66° Bé (owf) to exhaust the color.

Preliminary tests indicate that, with a few exceptions, the fastness to light and fastness to washing of these dyes are comparable to those on wool.

Blends of staple Orlon A-3 and wool present a problem in union dyeing because of the greater affinity of acid dyes for wool. Very poor exhaustion is obtained on staple Orlon with acid dyes in neutral solution or in the presence of acetic or formic acid. This subject is the object of further study.

Special techniques will have to be developed for dyeing viscose-staple Orlon A-3 blends. Sulfuric acid cannot be used in the presence of viscose rayon, and with formic acid the exhaustion of the acid dye is poor. Studies of means of improving exhaustion are in process so that unions may be dyed with direct and acid dyes. Acetate dyes will also have to be considered for staple Orlon. This fiber has since been withdrawn from the market by du Pont.

Type 41 staple Orlon has recently been announced. This fiber is essentially acrylonitrile like the filament type and presents similar dyeing problems. It has a somewhat better affinity for acetate-rayon dyes than filament Orlon. The cuprous copper method offers promise for the application of a selected and limited group of acid dyes.

Chemstrand is the staple acrylic fiber produced by American Viscose and Monsanto. Production is in the pilot-plant stage at present. Preliminary dyeing tests indicate that it is very similar but not identical in dyeing properties to staple Orlon A-3.

DACRON——Dacron made by Dupont is a new type of linear polyester based upon a condensation of terephthalic acid and ethylene glycol. Its physical properties offer great promise for textile application. It has a good hand, high wet and dry strength, good color, good resistance to light and to chemicals. It responds to heat setting. Selected acetate dyes meet most end-use requirements for Dacron. These dyes may be applied at the boil for light shades, but for dark shades a suitable carrier or high-temperature (250°F) dyeing is required in order to obtain penetration and exhaustion. Carrier dyeing depends upon the use of so-called swelling agents, which open up the internal fiber structure and permit diffusion to occur more readily. Recent studies that we have made of this process offer great promise *(5)*.

By means of monochlorobenzene as a carrier, acetate dyes have been applied on Dacron at temperatures under 212°F to obtain dyeings of outstanding penetration and fastness to washing. Fastness-to-light tests indicate that the Fade-Ometer causes more deterioration than comparable sunlight. If this factor is taken into account, selected dyes are very good. This method of dyeing is also valuable for dyeing unions with wool inasmuch as the carrier promotes exhaustion of acetate dye on Dacron and keeps it off the wool. Any staining of the wool with acetate dye can be readily removed by scouring with a synthetic detergent and ammonia at 140°F. The wool can then be brought to shade with acid or premetalized dyes, which have no affinity for Dacron. Excellent fastness properties are obtained. The use of monochlorobenzene has been limited so far in practical application to the dyeing of Dacron raw stock or tops in closed circulating machines.

Filament or spun Dacron piece goods may be dyed continuously with selected vat dyes or the leuco esters of vat dyes. In the case of the vat dyes, the goods are padded with vat acid, dried, and heat-set at 350°F for one to five minutes. Oxidation is completed as a part of a continuous soaping operation. Dyeings of excellent penetration are obtained. The leuco esters of vat dyes are padded on with a suitable oxidizing agent and catalyst. The goods are dried and heat-set at 350°F for periods of time up to one minute. Oxidation is completed during the heat setting. Soaping follows in the conventional manner. By these two methods, a complete range of light to medium shades of good fastness to washing and to light may be produced. Inasmuch as Dacron may require a heat setting for maximum stability and finish, this operation could be integrated with the dyeing operation by these processes.

Dark shades may also be produced with selected vat dyes at conventional dyeing temperatures through the use of a suitable carrier. This method would be particularly applicable to the dyeing of raw stock, top, or yarn in a package machine.

CELCOS——Celcos is a fiber with an acetate core and a saponified surface, produced by the Celanese Corporation. It has affinity for both direct and acetate dyes. Novel effects are produced in piece goods by utilizing this fact, as in a blend with viscose rayon the Celcos absorbs both

direct and acetate dyes. Crimped Celcos yarn is of interest to the carpet trade where it is dyed with fast-to-light direct colors. In general, the fastness to washing of direct or direct-and-aftertreated shades on Celcos is inferior to the comparable shade on viscose rayon. The leuco esters of vat dyes may be utilized to produce fast-to-light and fast-to-washing shades on 100% Celcos piece goods.

FORTISAN —— Fortisan is a high-tenacity rayon produced by the Celanese Corporation through stretch spinning of saponified cellulose acetate. This fiber is of particular interest because of its high tensile strength. Because of the nature of its physical structure the affinity of Fortisan for dyestuff has been reduced to approximately 75% of that obtained on regular viscose rayon. It is therefore necessary to pretreat it with caustic soda in order to improve dye affinity. Yarn or piece goods treated in this manner may be dyed with diazo colors, naphthols, sulfurs and vats. A typical example of jig application is to treat for 20 minutes in a 6% solution of caustic soda at 68 to 70°F and to rinse out the alkali with cold water. Dyeing with vat dyes at 130 to 150°F follows in the conventional manner.

GLASS——The fire resistance of glass makes it an ideal material for curtains and draperies. Current developments by Owens-Corning Fiberglas open up new vistas. When glass piece goods are treated at temperatures of 1200 to 1300°F to produce drape and absorbency for color, they are effectively cleaned by the heat at the same time. By treatment with codispersed resin polymers, vat pigments and Teflon, colored fabrics of improved drape, abrasion resistance and fastness properties are obtained.

NEW FIBERS AND EQUIPMENT DEVELOPMENT

HIGH TEMPERATURES——The valuable properties of many of the new synthetic fibers, such as tensile strength and quick drying, result from the high degree of orientation present. Such fibers have low water-absorptive properties. Temperatures of dyeing near the boil and higher favor penetration and absorption. The closed jig, which has been so valuable for the dyeing of nylon through maintenance of temperatures above 200°F, should also be of interest for other synthetics. Temperatures as high as 250 to 270°F are often desirable for dyeing synthetics. Continuous equipment has been developed by the Uxbridge Worsted Company which permits open-width padding of piece goods followed by passage through an autoclave at 50 lb of pressure and a temperature of 270°F. Although primarily developed for worsted piece goods, the possibilities of such a process for synthetics can be readily recognized.

Package equipment operating under pressure at temperatures of 250 to 270°F is now in production for the dyeing of Orlon and Dacron. It is expected that hosiery dyeing machines will also be designed to operate at such higher temperatures.

DRY HEAT —— Dye penetration on many of the new synthetic fibers is greatly assisted by temperatures of 350 to 410°F for periods of time from seconds to minutes. It is expected that equipment along the lines developed for the heat setting of nylon will be considered for other fibers. The possibilities of combining a heat setting with a dyeing operation offer a great deal of promise.

STAPLE FIBER HANDLING——The new Williams continuous fiber-processing machine permits the continuous processing of fibers of loose stock. It may be used for dyeing, scouring and chemical treatments. Economies result from the passage of large quantities of stock through a restricted area in a machine with a low ratio of stock to liquor. Small lots may be run as economically as large. The volume of liquor utilized in a commercial unit is approximately 35 gallons and the time of passage is 30 to 90 seconds. Units may be connected in series to carry out unit operations. Single or double laps of fiber may be fed to the machine. The pulsating conveyors of the unit may be adjusted tensionwise to allow for differences in fiber or thickness of the stock. This equipment has passed the pilot-plant scale and will be put into production shortly. Further development work will be required to determine the full scope of its possibilities. Promising results have been obtained in scouring raw wool and in dyeing various fibers and fiber blends with many different kinds of dyes. Examples of such dyeing include the following: vat colors on wool, cotton, and/or staple rayon; acid dyes on wool and/or staple nylon; naphthols on wool, cotton, and/or rayon; directs on cotton and/or rayon; and sulfurs on cotton and/or rayon.

BIBLIOGRAPHY

(1) U S Patent 2,249,607 (July 14, 1941) by L C Galatioto (to Atlanta Rayon Corp).

(2) Rhode Island Section, AATCC "The Continuous Dyeing of Nylon Fabrics", *Am Dyestuff Reptr* 40, P14 (1951).

(3) Field, T A, Jr, "Dyeing and Finishing Dynel", *Papers of the AATT*, 238 (December, 1950).

(4) Meunier, Paul L, "Dyeing of New Synthetic Fibers", *Am Dyestuff Reptr* 40, P51 (1951).

(5) Waters, E, "The Dyeing of Terylene Polyester Fibre", *J Soc Dyers Colourists* 66, 609 (1950).

Membership Applications

SENIOR

Robert D Anderson—Dyer Peerless Laundry Services, Ltd, Los Angeles, Cal. Sponsors: N J Koehler, A B Stonstron.

John R Atkin—Divisional Supt, Verney Corp, Peterborough, N H. Sponsors: H M Hartnett, R W Powell.

William E Backus—Chemist and Dyer, Virginia-Carolina Chemical Corp, Taftville, Conn. Sponsors: J H Karrh, J R Magee, Jr.

Jack W Binns—Physical Testing Specialist, Philadelphia Quartermaster Depot, Philadelphia, Pa. Sponsors: F J Rizzo, R E Willett.

Robert H Blaker—Research Chemist, E I du Pont de Nemours & Co, Wilmington, Del. Sponsors: J F Laucius, C A Young.

Raymond J Bolin—Plant Supt, Moniteau Mills, Inc, California, Mo. Sponsors: A G Alexander, H R Calvert.

Richard J Boswell—Chief Dyer, Handcraft Co Inc, Princeton, Wisc. Sponsors: P J Willgeroth, W Boyd, Jr.

James A Bowdler—Technical Sales, Arnold, Hoffman Co Inc, Philadelphia, Pa. Sponsors: R Tull, R C Dowling.

T E Braconier—Head Laboratory Chemist, AV Alf Stigens Fabriker, Sandared, Sweden. Sponsor: S G Holm.

Ernest C Bratt—Asst Dyer, American Woolen Co, Champlain Mills, Winooski, Vt. Sponsors: A C Quance, C M Kopatch.

Joseph A Brooks—Dyer, E I du Pont de Nemours & Co, Newport Textile Lab, Newport, Del. Sponsors: C A Sylvester, R J Thomas.

William W Bussey—Technical Rerpresentative, General Dyestuff Corp, Charlotte, N C. Sponsors: L R Wadley, W C Wilcoxson.

Theodore H Caldwell — Sales Engineer, Dow Chemical Co, Atlanta, Ga. Sponsors: L E Whittelsey, W B Griffin.

Raymond T Clarke—President, Polymer Southern, Inc, Greenville, S C. Sponsors: J D Fortenberry, J H Hasty, Jr.

S Truman Clary—Analytical & Research

Chemist, Warwick Chemical Co, Wood River Junction, R I. Sponsors: H B Goldstein, D J Ecclestone.

Eugene C Cook—Vice President, Willis Hosiery Mills, Inc, Concord, N C. Sponsors: J V Boone, W A Daniel.

Irving Duffen—Dyer, Duffen Dye Works, Portsmouth, Va. Sponsors: H A Cathey, D B Finn.

W Gordon Dunning — Sales & Service, Procter & Gamble Dist Co, Cincinnati, Ohio. R E Derby, E B Bell.

Albert R Eanzel—Salesman, E I du Pont de Nemours & Co, Inc, New York N Y. Sponsors: E W Schmalenberger, C F Mentzer.

Stanley M Fagan — Overseer of Dyeing, Carleton Woolen Mills, Rochdale, Mass. Sponsors: H A Morrison, W J Flanagan.

Earl W Fitch—Dyer, Robbins Mills, Inc, Clarksville, Va. Sponsors: E S Horney, R B Blodgett.

Percy N Fletcher—Head Dyer, Theme Hosiery Co Inc, Los Angeles, Cal. Sponsors: H A DesMarais, L S Thompson.

Arthur J Forman, Jr—Textile Chemist and Colorist, General Dyestuff Corp, New York, N Y. Sponsors: J H Hennessey, T J Walsh.

Ralph A Forsaith—Manager, Strong-Wall Mills, Inc, (Bemis Bros Bag Co) Cannelton, Ind. Sponsors: L R Fox, E Morrill.

Fred Fortess—Section Head, Celanese Corporation of America, Summit, N J. Sponsors: C E Kip, W B Horback.

Gordon L Frasier—Dyer, Polatine Dyeing Co, St Johnsville, N Y. Sponsors: H Gendreau, G J Greendonner.

Henry P Freigruber—Partner, Detroit Dye Works, Detroit, Mich. Sponsors: A A Barker, W H Wadsworth.

Halvor Halvorsen—Textile Colorist, General Dyestuff Corp, New York, N Y. Sponsors: C Z Draves, L S Thompson.

Robert H Harris—Supt of Dyeing, Spalding Knitting Mills, Griffin, Ga. Sponsors: A K Haynes, W B Griffin.

Charles R Humphreys—Manager, Technical Sales Service Dept, Ducilo S A, Buenos Aires, Argentina. Sponsors: L G Ray, Jr, B F Faris.

Marjorie M Jenkins—Lecturer in Textiles and Clothing, Macdonald College, Quebec, Que. Sponsors: M J Babey, R J G Schofield.

Walter Kling—Chemist, Bohme Fettchemie, GMBH, Dusseldorf, Germany.

Frederick J Knight—Managing Director, Hubbard Felt Co, Ltd, Montreal, Que. Sponsors: J M Loebel, H C Chapin.

James H Lowe—Canadian Representative, Nova Chemical Corp, New York, N Y. Sponsors: C A Funke, R A Funke.

Jerry M Mecco—Textile Colorist, Calco Chemical Div, American Cyanamid Co, Bound Brook, N J. Sponsors: H E Millson, F Fordemwalt.

Robert L Miller, Jr—Asst Foreman, P H Hanes Knitting Co, Winston-Salem, N C. Sponsors: R H Smith, L H Roane.

Mae Y Moore — Instructor in Textile Chemistry, Drexel Inst of Technology, Philadelphia, Pa. Sponsors: J F Osterling, F J Rizzo.

Jackson W Morton—Head of Rayon Tech Service, "Sanforized" Div, Cluett, Peabody & Co, Troy, N Y. Sponsors: J Epelberg, L S Lang.

Francis L Moses—Salesman, General Dyestuff Corp, Providence, R I. Sponsors: W A Lord, R B Taylorson.

Robert J Myers—Research Supervisor, Rohm & Haas Co, Philadelphia, Pa. Sponsors: H F Lawton, A C Nuessle.

Nakamoto Mamoru—Chief Director, Japanese Standards Association, Tokyo, Japan. Sponsors: L S Little, A E Johnson.

Kasthuri I Narasimhan—Deputy Dyeing & Printing Master, Bombay D & M Co, Ltd, Parel, Bombay, India.

Hobert W O'Briant—Dyer, National Dyeing & Finishing Corp, Culver City, Calif. Sponsors: J R Nehmens, R B Coleman.

Jeremiah J O'Brien — Bleacher, Uncas Printing & Finishing Co, Mechanicsville, Conn. Sponsors: R M England, S F Sylvester.

John J Ormand—Dept Head, Decorative Fabrics Div, Burlington Mills Corp, Burlington, N C. Sponsors: W L Triplett, C Hooper.

June E Otto—Director, Public Relations, Bradford Dyeing Assoc (USA), New York, N Y. Sponsors: P J Luck, G L Baxter.

Harry Peers—Resident Manager, National Aniline & Chemical Co, Ltd, Toronto, Ontario, Canada. Sponsors: E W Camp, F J Acker.

Frank J Pilpel—Dyer, Mid-West Processors, Inc, Libertyville, Ill. Sponsors: C E Bick, P D'Amour.

John E Politi—Colorist, Peerless Screen Printers, Inc, Brooklyn, N Y. Sponsors: W S Trezise, W Naef.

Arthur W Powell—Partner, Miami Dye Works, Miami, Florida. Sponsors: W F Crayton, J W Billingsley.

Eugene Purcell—Dyer, Fieldcrest Mills, Spray, N C. Sponsors: J F Byrd, F W Sturtevant.

George W Ray—Overseer of Finishing, Delta Finishing Plants, Cheraw, S C. Sponsors: K E Traynham, J R Massey.

John P Redston—Sales Manager, Textile Chemical Dept, E F Drew & Co Inc, New York, N Y. Sponsors: L W Davis, S Cohen.

Albert R Robbin—Chemist, Stein, Hall & Co, New York, N Y. Sponsors: F G LaPiana, J B Wathy.

Troy F Robbins — Salesman, Commonwealth Color & Chemical Co, New York, N Y. Sponsor: C M Robbins.

Stephen I Rudo—Chief Engineer, Werner Textile Consultants, New York, N Y. Sponsors: C W Bendigo, A F Tesi.

Tsune J Sakanoue — Director, Head of Technical Dept, Fuji Spinning Co Ltd, Tokyo, Japan. Sponsors: H L Bailey, R J Ross.

John R Schenck—Mgr Southern Office, Proctor & Schwartz, Inc, Philadelphia, Pa. Sponsor: W L Barker.

David C Scott—President, Scott Testers, Inc, Providence, R I. Sponsors: E D McLeod, H C Chapin.

Raymond C Sherman—Chemist, Interlaken Mills, Fiskeville, R I. Sponsors: R B Taylorson, B B Meady.

Albert P Shutts—Salesman, Buffalo Electro-Chemical Co Inc, New York, N Y. Sponsors: B K Easton, F P Greenspan.

Donald H Spitzli—Director of Research, The Linen Thread Co, Paterson, N J. Sponsors: J R Bonnar, F W Adams.

Joseph G Storck—Chemist, A N Townson, Philadelphia, Pa. Sponsors: D J Kelleher, H L Steen.

Arnold A Stulce—Chemical & Dyestuff Salesman, Commonwealth Color & Chemical Co, New York, N Y. Sponsor: C M Robbins.

Robert L Stutz—President, Better Fabrics Testing Bureau, Inc, New York, N Y. Sponsors: L S Little, A E Johnson.

Peter S Szynal—Dyer, Hayward Hosiery Co, Ipswich, Mass. Sponsors: A E Sampson, L N Putnam.

John A Tirri—Dyer, A M Townson, Philadelphia, Pa. Sponsors: D J Kelleher, H L Steen.

James E Torbet—Chemist, Celanese Corp of America, Cumberland, Md. Sponsors: G C Ward, E W Price.

Cecil C Urquhart—Overseer of Dyeing, Canadian Cottons Ltd, Hamilton, Ont. Sponsors: O W Clark, S J Luscian.

Stanislav J V'Soske—Designer, V'Soske, Inc, Grand Rapids, Mich. Sponsors: W G Diamond, T H Hart.

Thaddeus C V'Soske—President, Creative Textiles, Inc, Vega Baja, Puerto Rico. Sponsors: W G Diamond, T H Hart.

Russell C West—Asst Dyer, Champlain Mills, Winooski, Vt. Sponsors: A C Quance, C W Kopatch.

Earl L Youse—Research and Development, General Aniline & Film Corp, Easton, Pa. Sponsors: H B Freyermuth, A Stefcik.

Eberhard R Zinkernagel—Chemical Engineer, J R Geigy S A, Basle, Switzerland. Sponsors: D P Knowland, E W Birdsall.

JUNIOR

Newton C Brackett—Trainee, Rayon Dyeing & Finishing, Dan River Mills Inc, Danville, Va. Sponsors: G Cocoros, C H Payet.

Barend Dalenoord—Globe Dye Works, Philadelphia, Pa.

Roy H Forster—Dyer, Samarkand Rug Mill, Rock Hill, S C. Sponsors: A R Thompson, S L Hayes.

Elias M Haddad — Chemical Engineer, Companhia Industrial Nossa Senhora da Conceicao, Sao Paulo, Brazil. Sponsors: O W Clark, E J Glaeser.

Earl H Hartgrove, Jr—Textile Research, The Springs Cotton Mills, Lancaster, S C. Sponsors: R M Hughes, R M Stribling.

Thomas F Healy—Textile Chemist, Interchemical Corp, Pawtucket, R I. Sponsors: J R Redmond, E W Counsell.

Beattie H Hipps—Finishing Trainee, Burlington Mills, Greensboro, N C. Sponsors: R W Powell, M R Fillippeli.

Frank J Iuliano—Laboratory Technician, Interchemical Corp, Pawtucket, R I. Sponsors: J R Redmond, E W Counsell.

Robert H Jewell, Jr—Textile Engineer, Crystal Springs Bleachery, Inc, Chickamauga, Ga. Sponsors: J D Moshim, H P Loveless, Jr.

Victor O Lopez — Trainee, Converting Dept, Assoc Textiles of Canada, Louiseville, Que. Sponsors: F H Myers, C F Hanson.

Felix S Lutten—In charge dyeing & finishing, Textile Limatambo S A, Callao, Peru. Sponsors: M J Blackwood, S H W Nye.

Reid Y Meredith—Assistant Dyer, Wreno Hosiery Co, Thomasville, N C. Sponsors: C J Dulin, C A Sledge.

Chung-Sheng Na — Research Chemist, Lowell Textile Institute, Lowell, Mass. Sponsors: G R Thompson, E E Fickett.

Donald K Ratcliffe — Salesman, General Chemical Div of Allied Chemical & Dye Corp, Charlotte, N C. Sponsors: J C Whitt, W D Livingston.

Robert K Shaughnessy—Colorist, National Aniline Division, Allied Chemical & Dye Corp, Buffalo, N Y. Sponsors: E E Fickett, J K Frederick.

George C Smith, Jr—Sales Trainee, General Dyestuff Corp, New York, N Y. Sponsors: C Z Draves, O L Sherburne.

J Jack Weiss — Textile Chemist, Emkay Chemical Co, Elizabeth, N J. Sponsors: H M Friedman, A Malick.

ASSOCIATE

Attilio S Aloia—Junior Chemist, National Aniline Div, Allied Chemical & Dye Corp, New York, N Y.

Thomas A Bankmann — Technical Sales, The Liquid Carbonic Corp, Cambridge, Mass.

Frans J Banning—Arnhem, Netherlands.

Frederick E Bemis—Salesman, B L H Dyestuff Co, Providence, R I.

Walter C Boliver—Laboratory Chemist, Clearwater Finishing Co, Clearwater, S C.

Frank J Chwalek—Production Foreman, Calco Chemical Div, American Cyanamid Co, Bound Brook, N J.

Benjamin Grodman—Director, Dept of Purchase, City of New York, New York, N Y.

Anthony Harhalakis—Supt, Greek State National Laboratory, Piraeus, Greece.

Herbert A Jacob, Jr—Boss Dyer, William D Sykes & Co Inc, Philadelphia, Pa.

Arthur R King—Instrumentation Engineer, Minneapolis-Honeywell Regulator Co, Waltham, Mass.

Edward King—Vice President, Oriental Rug Cushion Co Inc, Los Angeles, Cal.

Dolarrai R Koya—Importers & Dealers in Dyestuffs, D R Koya & Co Ltd, Bombay, India.

Steinthor H Kristjansson — Asst to the Manager, Gefjun Woolen Mills, Akureyri, Iceland.

Theodore B Lefferdink—Research Chemist, Dow Chemical Co, Pittsburgh, Cal.

David S Linz — Dye House Manager, Schneider Dye Works, Philadelphia, Pa.

Jean P Phaneuf—Chemist, The International Silver Co, Meriden, Conn.

Vladislovas V Polisaitis—Technical Salesman, Produtos Quimicos Ciba S A, Sao Paulo, Brazil.

Thomas L Reiling — Senior Salesman, Emery Industries, Inc, Cincinnati, O.

Dr Angelo G Scapini—Milano, Via Giacomo Watt, 22, Italy.

Morris Sherman — Textile and Research Chemist, Textile Research Labs, E St Louis, Ill.

Ogata Shigeyuki—Chief Research Dept, Kurewa Spinning Co, Osaka, Japan.

Henry E Talbot—Demonstrator, Colloids, Inc, Newark, N J.

STUDENT

Richard H LaPlante—Lowell Textile Institute. Sponsor: E E Fickett.

Clayborn B Reinhart—Georgia Institute of Technology. Sponsor: C A Jones.

William C Walter, Jr—Philadelphia Textile Institute. Sponsor: W H Hughes.

Applications for Transfer to Senior Membership:

Melvin Alpert
Leo Beck
John L Crist, Jr
Irwin Daniels
A H DeMarco
Charles J Duddy
James B Egee
Horace R Hilton
Albert E Johnson
Gloria J Keppler
J B Koller, Jr
James C Lehr
Ernest T McIlwain
Jack Z McNab
N Judson Miller
John W Moore
Paul J Pernice
Richard F Strauss
Duane W Snyder
Charles R Trommer
John Wilson
Cyril Young

Philadelphia Section Meeting Report

September 14, 1951
Kugler's Restaurant, Philadelphia, Pa

A meeting of the Philadelphia Section was held on September 14th in the English Room of Kugler's Restaurant in Philadelphia with 125 attending the dinner and 143 the technical session.

The Nominating Committee reported on its selection of 1952 Section Officers as follows:

Chairman—Edward C Diehl, Ankokas Dyeing & Processing Co.

Vice-chairman — Harry L Morgan, James Lees & Sons.

Treasurer—Frederick V Traut, Globe Dye Works.

Secretary — Thomas J Scanlon, Calco Chemical Division.

Councilors—James Dixon, Calco Chemical Division; A E Raimo, John Campbell & Co; E E Rettberg, Jr, Scholler Bros, Inc; Richard B Stehle, Allegheny Dye Works; Dr S Graeme Turnbull, Jr, du Pont Co; Jackson A Woodruff, American Viscose.

Sectional Committee—C T Anderson, Ciba Co, Inc; Harry F Clapham, du Pont Co; Albert C Nuessle, Rohm & Haas, Inc; Prof Percival Theel, Philadelphia Textile Institute.

I Reiner, Millville Mfg Co, presented a paper "Continuous Vat Dyeing on Cotton Piece Goods." During the discussion period that followed his talk, Mr Reiner was assisted by Paul L Speakman, du Pont Co; John W Wilson, Delta Co; and Frank B Lutz, Millville Mfg Co.

Respectfully submitted,
THOMAS H HART, *Secretary*

—♦ ♦—

Pacific Southwest Section Meeting Report

August 3, 1951
Nikabob Restaurant, Los Angeles, Cal

THIRTY-TWO members and guests attended a dinner meeting of the Pacific Southwest Section in the Nikabob Restaurant, Los Angeles, California on August 3, 1951, at which Frank Stephens of the Minneapolis-Honeywell Regulator Company's Los Angeles office was the speaker. Mr Stephens discussed control instruments applicable to operations in the textile industry.

Harry M Fieger was appointed Sergeant-at-Arms for the Section.

Plans for the 3rd annual outing (which was held on October 6 at Ojai Valley Inn, Ojai, Cal) were discussed by Norman G Koehler.

Respectfully submitted,
JUNE ERICSON, *Secretary*

BOOK REVIEW

Handbook on Weaves

G H Oelsner
(Translated by Samuel S Dale)

This handbook on weaves broadly covers a variety of weaves, and is extensively illustrated throughout with harness-drafts and diagrams.

In the beginning, the text indulges only briefly on the basis of designing relative to drawing-in drafts, and then continues about weaves in general. Twills, crepes, and ply cloths are very well explained and illustrated with a considerable number of harness drafts. There is a short chapter on tricot weaves, which the author explains as weaves to simulate a knit fabric.

It is believed that a handbook of this nature should include leno and jacquards in its text. These are omitted, although mock leno is mentioned. Color patterns are also covered well, but no mention is made of box chains or the method of getting the color features into the fabric. Although this omission is not important, the omission of the development of the chain draft leaves a gap in the completeness of the book. Harness drafting is too closely correlated with chain drafting to be left out, especially in many of the weaves that involve a great number of harnesses—as are so profusely illustrated in the harness drafts of the text.

The book is not for a beginner. The designer or millman will find this book filling a worthwhile niche in his reference library.—ATW

NEWS

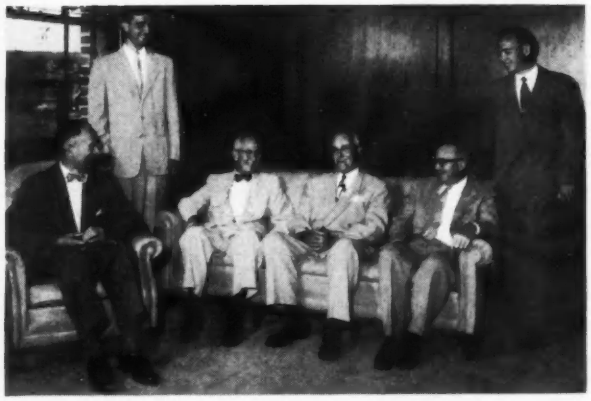
• Butterworth Completes Bethayres Expansion

H W Butterworth & Sons, Co, machine builders since 1820, are now occupying a large new addition at Bethayres, Pa, following completion of a $300,000 plant expansion program. The new building comprises the main erecting shop, tenter chain and pressed roll departments, shipping department, drafting room and business offices. Floor sace is said to total 68,000 square feet.

Completion of the plant is the third step in the 4-year expansion program, Butterworth having completed a large new machine shop in 1947 and having converted the Bethayres foundry for manufacturing operations in 1950. Butterworth plants in Philadelphia and Providence were sold during this period and obsoles-

Aerial view of the New Butterworth Plant at Bethayres, Pa.

The Main Erection Floor of the Plant.



Principal Executives of the Butterworth Firm Together with Members of the 6th Generations of the Butterworth Family, Who are Now Serving Apprenticeships.

(L to r): J Egbert Butterworth, vice-president and secretary; J Egbert Butterworth, Jr; Harry W Butterworth, Jr, president; DeHaven Butterworth, vice-president in charge of sales; John H S Spencer, executive vice-president and treasurer; DeHaven Butterworth, Jr. John H S Spencer is not shown in the picture.

cent machinery was scrapped during moving to the consolidated operations in Bethayres.

Harry W Butterworth Jr, president, points out that the production capacity of the Company is now at the highest point in its 130-year history.

• ARCC-APC Appoint Detroit Firm as Michigan Representatives

Baker & Collinson of Detroit have been appointed agents in the state of Michigan for the American Resinous Chemicals Corporation and the American Polymer Corporation, Peabody, Massachusetts, and their associated companies.

Baker & Collinson, a 50-year-old firm, maintain warehouse facilities in conjunction with their offices at 1200 Mt Elliott Avenue, Detroit.

• Cyanamid Entertains ACS Chemists

As part of American Cyanamid Company's program of entertaining chemists attending the American Chemical Society's "World Chemical Conclave" in New York last month, some 100 foreign chemists representing 14 nations visited the Stamford Research Laboratories in Stamford, Conn, September 10th and 11th. The chemists were addressed by Dr J T Thurston, the Laboratories' director.

About 100 chemists visited Lederle Laboratories in Pearl River, New York, on September 11th, and that evening all foreign chemists attending the Conclave were invited to a reception at the Hotel Statler in New York. The company's Calco Chemical Division sponsored a week-long series of programs, ending September 11th, on "Chemistry on a Cosmic Scale" at the Hayden Planatarium in New York.

Cyanamid also entertained chemists at its plants in Hamilton, Ohio, and Niagara Falls, Ontario.

A view of Southern Latex Corporation's Austell, Georgia, Plant.

• Southern Latex Acquires Compounding Equipment

The Southern Latex Corporation has acquired the compounding equipment in the Dalton (Ga) plant of the Testworth Laboratories, Inc for installation in their Austell, Ga plant.

The Dalton property will be used exclusively as a warehouse and distribution point for products manufactured in Testworth's main plant at Columbia City, Ind.

• Rodney Hunt Switches Southern Office

Rodney Hunt Machine Co, Orange, Mass, has announced the relocation of its southern regional office from Greenville, S C, to Room 909, Wilder Bldg, 237 S Tryon Street, Charlotte 2, N C; (telephone: 6-2163).

A P Hyde, Rodney Hunt sales engineer, is in charge.

• American Chemical Society Honors NBS

At the fourth annual ACS summer symposium the Analytical Division paid tribute to the National Bureau of Standards in honor of their 50th anniversary, presenting an honor scroll to the Bureua in appreciation of the Bureau's work in chemistry and other fields of science and engineering. The presentation was made by N H Furman, president of ACS to E U Condon, Director of NBS.

• Expanded Production of Polyamide Resin Suspensoids

General Mills, Inc, Minneapolis, Minn, has expanded production of Polyamide Resin Suspensoids, which were introduced in February, 1950. The products, of four types, will for the first time be consistently available in large quantities (carload lots), according to Fred B Speyer, product development specialist.

The Suspensoids are opaque white, water suspensions of General Mills' heat-sealing Polyamide Resins, finding their largest volume use as heat-sealing adhesives and coatings.

Recently, the Suspensoids, which are said to be resistent to greases, oils, water and water vapor, have also worked their way into so-called "wet stick" adhesives, as soil-resistant coatings for textiles, as protective and decorative coatings, etc.

• Heyden Export Corporation Formed

The Heyden Export Corporation, a wholly owned subsidiary of Heyden Chemical Corporation, has been formed to specialize in sales of antibiotics, pharmaceuticals and chemicals in the Western Hemisphere.

Paul van der Stricht, secretary and a director of Heyden Chemical Corporation as well as a director of American Potash and Chemical Corporation, has been elected president of the new company.

COMING EVENTS

AMERICAN ASSOCIATION OF TEXTILE TECHNOLOGISTS

Meetings: November 7, December 5 (Builders Club, New York.)

AMERICAN SOCIETY FOR TESTING MATERIALS

Spring Meeting and Committee Week, March 3-7, 1952, Cleveland, Ohio.

Annual Meeting, June 23-27, 1952, New York, N. Y. (The biennial Apparatus and Photographic Exhibits will be held in conjunction with this meeting).

1953—Spring Meeting (Hotel Statler, Detroit, Mich.)
Annual Meeting (Chalfonte-Haddon Hall, Atlantic City, N J.)

1954—Spring Meeting (Shoreham Hotel, Washington, D C)
Annual Meeting (Sherman Hotel, Chicago, Ill.)

AMERICAN STANDARDS ASSOCIATION

33rd Annual Meeting: October 24, Waldorf-Astoria, New York, N. Y.

FIBER SOCIETY

Meeting: April 16-17, 1952 (Clemson House, Clemson, S. C.)

NATIONAL ASSOCIATION OF TEXTILE MACHINERY MANUFACTURERS

Exhibit of American Textile Machinery, April 26-May 1, 1954, Atlantic City Exhibition Hall. Atlantic City, N. J.

NATIONAL STANDARDIZATION CONFERENCE

2nd Annual Meeting: October 24, Waldorf-Astoria, New York, N. Y.

NEW YORK BOARD OF TRADE

26th Annual Dinner of the Drug, Chemical and Allied Trades: March 6, 1952.

26th Annual Meeting: September 21-22, Shawnee-on-Delaware, Pa.

SOCIETY OF PLASTIC ENGINEERS, INC.

January 16-18, Edgewater Beach Hotel, Chicago, Ill.

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION OF THE UNITED STATES

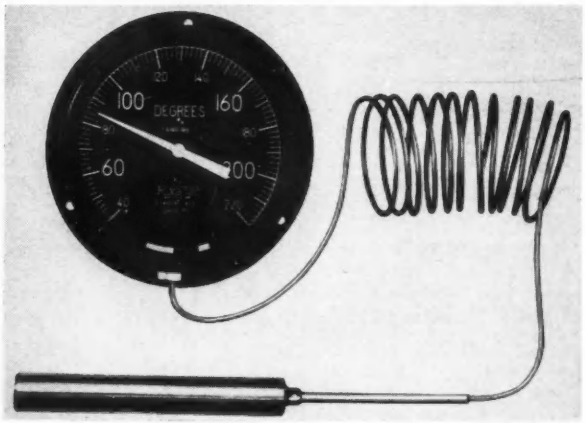
Luncheon Meeting — Hotel Commodore (November 14.)

Annual Meeting and Dinner—Hotel Commodore (December 11).

TEXTILE RESEARCH INSTITUTE

Annual Meeting, Nov. 8-9.

NEW PRODUCTS AND DEVELOPMENTS



Foxboro Dial Thermometer

• Corrosion-Resistant Dial Thermometer

A new model "lifetime" dial thermometer has been specifically designed for the requirements of the textile dyeing and finishing trades by The Foxboro Company, Foxboro, Mass, having the same corrosion-resistant construction as the "lifetime" dye tube thermometer introduced by Foxboro two years ago, A large, uniform dial scale allows temperature measurement from 40° to 220°F.

The new uniform-scale thermometer is a stock item with standard 10-foot length of tubing. It is available with either a plain neck bulb for open tank mounting or a union neck bulb for use wherever a screwed connection is desired. The movement is of stainless steel, the case of corrosion-resistant aluminum alloy, and the bulb and tubing of Type 316 stainless steel. As a result of this and a vapor-tight seal for the case, the instrument is said to be completely protected against corrosive vapors and liquids. Complete information is given in Foxboro Application Engineering Data Sheet 220-29, available on request.

• New Du Pont Water Repellent

"Aridex" PER, a renewable water repellent for direct use in dry cleaning equipment employing synthetic solvents has recently been put on the market by the Fine Chemicals Division of du Pont's Organic Chemicals Department.

A concentrated solvent-type water repellent, the product is designed for use in systems employing synthetic cleaning fluids such as perchlorethylene and carbon tetrachloride. Through use of a storage tank and pump connected to the cleaning cylinder, "Aridex" PER reportedly may be applied to all types of garments and articles that can be dry cleaned, without removing them from the cylinder.

Du Pont reports that the product, in addition to producing an excellent repellent effect and a pleasing hand on fabrics, also reduces the wrinkling of fabrics by resisting the absorption of moisture and perspiration. Soils are said to cling less tenaciously to garments and fabrics treated with this new repellent, resulting in easier and more rapid cleaning.

With the advent of this new product du Pont now offers a complete line of renewable water repellent products — "Aridex" DCN for use with petroleum solvents, "Aridex" L Conc for laundering and wet cleaning, and now "Aridex" PER for use with synthetic solvents.

• Stienen-Obermaier Perfects Combination Extractor-Drier

Culminating many years of practical research application, Standard Fabricators, Inc, Walton Ave, Bronx, N Y, has perfected the Steinen-Obermaier Combination High-Speed Extractor-Drier, according to George T Kreis, treasurer and sales-manager. This new system has been cited by some sources as cutting total drying time more than half over other systems.

As results of the system's development, Standard Fabricators suggests faster turnover of yarn in the dyehouse; elimination of bottlenecks; and the cutting in half of production time, amount of floor space and number of material carriers.

In actual operation, the material carrier is removed from the dyeing machine and placed in the extactor-drier. In small installations, the entire operation will be concluded in this one machine, the entire cycle requiring approximately 1½ to 2 hours. In larger installations, the extractor-drier is used in conjunction with the new "Stienen" High Speed Port System Driers, which are said to accomplish the drying operation in the same time as the combination machine.

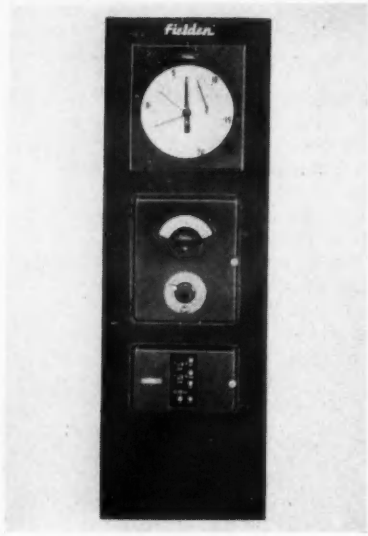
• Improved Methods Sought for Flameproofing Cottons

An extensive program of chemical research to develop "better" flameproof cotton fabrics is currently being undertaken for the Army Quartermaster Corps by the Southern Regional Research Laboratory of the U S Dept of Agriculture in New Orleans. Practical methods that can be applied commercially at reasonable cost to obtain permanent flameproofing without imparting undesirable properties are being sought, according to Dr G E Hilbert, chief of the Bureau of Agricultural and Industrial Chemistry.

In a combined attack on the problem, the QM Corps and SRRL are reportedly going after basic information on the mechanism of fireproofing and the fundamental differences in the effectiveness of various techniques. New chemical reagents with flameproofing properties are being sought as substitutes for scarce, imported materials in addition to the investigation of new techniques for applying known flameproofing agents to obtain greater effectiveness.

One such technique involves the addition of soluble resinous materials to the cotton, followed by a heat treatment, which makes them insoluble and resistant to removal by washing, yet does not prevent their decomposing to stop the cloth from bursting into flame if exposed to fire.

Another approach to the problem is that of chemical modification. Instead of impregnating the fabrics with chemicals, the treatment is applied in such a manner that the chemicals are made to react with the cellulose of the cotton, forming virtually new fibers with new properties. Dr Hilbert has stated that this is a relatively new idea in flameproofing, but that the technique has been applied successfully at the Southern Laboratory in developing improved cottons with other desirable properties, such as ion-exchange ability and resistance to mildew, rot, or heat. Some of these chemically modified fabrics appear promising for further treatment to obtain fire-resistance and will be investigated in the cooperative studies now under way, it is reported.



Automatic Controller for Fielden Drimeter

• Fielden Develops Drimeter Auxiliary Equipment

For use with the Fielden Drimeter, the Fielden Instrument Corp, 2920 North Fourth St, Philadelphia 33, Pa, has developed new automatic control equipment to provide continuous indication and record of moisture content in warp or cloth and to automatically control the slasher or dryer to correct any deviation from the desired moisture content.

The equipment reportedly may be used on any type of slasher or fabric dryer. It is said to be simple to install, and cannot be damaged by incorrect adjustment of the preset timing controls.

The control is designed to ignore wet seams or momentary wet patches and to make corrections, which are proportional to the deviation from the desired moisture content at time intervals that are automatically adjusted to suit the machine speed. Close control of moisture content is said to be provided, usually within ± 1¼%, without hunting, on any weight of warp or cloth at any machine speed.

Push buttons for manual control are reported to be provided on the instrument panel and may also be installed elsewhere. Pilot lights indicate when moisture is within tolerance limits, too high or too low, and when a correction is being made.

Price, including recorder, timing panel, tachometer, and control relay is listed as $1250.

• New Dye Fixatives Added to Emkay Line

Emkay Chemical Co, 319 Second St, Elizabeth, N J, has announced the development of two new active dye-fixing agents, Emkafix R and Emkafix C, which are recommended by the manufacturer for aftertreatments on direct-dyed or printed cottons and rayons.

Emkafix R is a viscous liquid designed to meet dyers' and printers' requirements for excellent fastness to water, perspiration and hot wet pressing. It is said to greatly improve fastness to washing with minimum change of shade or brightness of the direct color. The product reportedly is easy to apply to direct-dyed piecegoods, printed fabrics and dyed skeins to prevent migration and bleeding of dyestuffs.

Emkafix C is a heavy, free-flowing liquid designed for use where fastness to washing and other specifications normally obtained with vat colors are required on direct-dyed cotton or rayon fabrics and yarns.

NAMES IN THE NEWS

• Hatch Celebrates 43 Years in Textiles

HERBERT H HATCH, Director of Hatch Textile Research, commercial testing laboratory, New York, N Y, marked his 43rd anniversary in the textile business last month. During the period he devoted his entire career to examining, grading and (since 1926) testing of textile fabrics. For over 35 years, he has also appeared as expert witness in litigations and arbitrations involving textile disputes.

Mr Hatch's early education in fabrics was received from his father, John Hatch, who established himself in the examining, grading and adjusting profession in New York on Canal Street, near Broadway, in 1880.

• T W Kitchen to Handle Atlantic Chemical Sales in South

T W KITCHEN has resigned from the Rodney Hunt Machine Company's organization to become the Southern sales representative for the Atlantic Chemical Co, Inc, Centredale, R I.

Mr Kitchen's headquarters will be at 1201 South Carolina National Bank Building, Greenville, S C. Prior to his association with Rodney Hunt, Mr Kitchen had been with Dan River Mills and, previously, North Carolina Finishing Company.

T W Kitchen

• Eversole Receives Union Carbide Appointment

The appointment of Dr JAMES F EVERSOLE as manager of research administration for the Union Carbide and Carbon Corporation was recently annnunced by Dr George O Curme, Jr, vice-president in charge of research. Dr Eversole will help co-ordinate the research activities of all of the Corporation laboratories where basic research and development work is being done on alloys, chemicals, gases, carbons, and plastics.

Dr Eversole joined the chemical research organization of the Corporation as a research chemist in 1929. Several years later he was assigned to the laboratories of Linde Air Prolucts Company, a Division of Union Carbide. In 1944, he was appointed Superintendent of Linde's laboratories at Tonawanda, New York, a position he has held until his present appointment.

• Duplan Appointment

ELLWOOD M EDDINGTON has been appointed Plant Superintendent of the Duplan Dyeing Co, Ltd, Valleyfield, Quebec.

Mr Eddington was formerly associated with Calco Chemical Division, American Cyanamid Company, and with the Sanforized Divisioin of Cluett Peabody and Company.

Ellwood M Eddington

• Finch Returns from Japan

DR ROGERS B FINCH, assistant professor of textile technology, Textile Division, Massachusetts Institute of Technology, has returned from a two month's visit to Japan as the textile education member of the Engineering Education Mission. The Mission, sponsored by the Supreme Commander for the Allied Powers and by the American Society for Engineering Education, participated in an Institute for Engineering Education jointly sponsored by the Ministry of Education and the universities. Conferences and discussions were held with educators, research workers, students, and industrialists in seven cities.

Professor Finch gave technical addresses to the Kanto Branch of the Textile Machinery Society, the Osaka Branch of the Textile Machinery Society, the Synthetic Fiber Association, the Nagoya Branch of Textile Technology, the Japan Society of Mechanical Engineers, and the Society of Cellulose and Textile Industry. Numerous visits were made to industrial and research organizations and conferences on textile education and research held in all centers.

• New ITT Research Fellows

11 new Research Fellows began the Fall term at the Institute of Textile Technology, Charlottesville, Va, on Sept 13, marking the fifth academic year of the Institute's educational program, which lead to an M S in textile technology.

New students include RICHARD P BARBER, ROBERT E STAPLES and THEODORE WILLIAMSON, JR, Bradford Durfee Technical Institute; ANIBAL L FERREIRA, LAWRENCE C LEGERE and ROBERT E STAPLES, New Bedford Textile Institute; ISAAC JARKOWSKY, Brooklyn College; EARL J NICKERSON and JAMES W WHITWORTH, Lowell Textile Institute; ARTHUR J PENDLETON, Rhode Island School of Design; and ROBERT G SEID, Georgia Institute of Technology.

• New GAF Personnel Relations Manager

WILLARD T DAVIS, of Albany, N Y, has been named personnel relations manager of the Grasselli, N J plant of General Aniline & Film Corporation, according to Chandler T White, vice president of the corporation and general manager of the company's General Aniline Works (Dyestuffs) Division. Mr Davis has served in a similar capacity at the Rensselaer, N Y plant since 1944. Grasselli is the larger of the two plants.

• Brooks New Butterworth Engineering Chief

STANLEY W BROOKS has been appointed chief engineer of H W Butterworth & Sons Co, Bethayres, Pa. Mr Brooks was chief engineer of the Textile Finishing Machinery Co, Providence, R I, when it was purchased by Butterworth in 1944. Since that time, he has been assistant sales manager of Butterworth's New England office and for the last year has worked in the engineering department at Bethayres.

• Sampson Returns from Europe

C W SAMPSON, export manager of Emery Industries, Inc, RCA Building, 30 Rockefeller Plaza, New York, N Y has returned from a ten week tour of Europe.

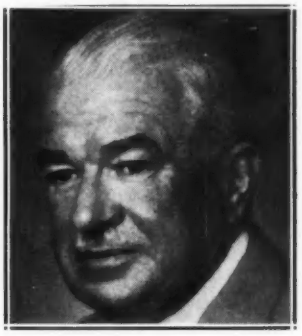
• Elphick Named Manager of Westvaco Nitric Acid Plant

NEIL C ELPHICK has been appointed resident manager of the $2,200,000 Nitric Acid plant being constructed by Westvaco Chemical Division of Food Machinery and Chemical Corporation for the Government at the Sunflower Ordnance Depot, Kansas.

Mr Elphick has been assistant manager of the Westvaco Division's Carteret, N J plant since June 1950 after serving as a production specialist in the New York office. He joined Westvaco in 1941.

• 3 Solvay Executive Promotions

The Solvay Sales Division, Allied Chemical & Dye Corporation, last month announced the following executive appointments: LESTER B GORDON, vice president; DENMAN PENISTON, director of sales; and JOHN H ELLEMAN, assistant director of sales.



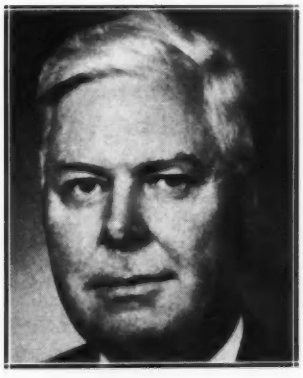
Denman Peniston

Mr Gordon is a veteran of 36 years of continuous service with the Solvay Sales Division and its predecessor companies. A native of Chicago, he began his chemical industry work in 1915 as a salesman in that territory. He has successively held posts as Solvay Chicago Branch manager, Divisional sales manager, Western sales manager, assistant director of sales and, for the past four years, director of sales.

Mr Peniston, a native New Jerseyan, began work as an office boy in the predecessor of the present Solvay Sales Division 41 years ago. Since that time, he has served as a salesman, assistant manager (and later manager of the New York Branch) and, for the past four years, assistant director of sales.

Colonel Elleman is a native of Indiana and was first employed by the Solvay Process Division in 1935 as an engineer in their Technical Service Section. Col Elleman in 1941 transferred to the Solvay Sales Division as a field technical advisor in the Calcium Chloride Department. In 1942, he returned to the Corps of Engineers, U S Army to serve as District Engineer in charge of the Syracuse, N Y, district. Upon his return to Solvay in 1945, he was appointed sales manager of the Calcium Chloride Department, the post that he is leaving to fill his present appointment.

Lester B Gordon



John H Elleman

• Werner to Head Celanese Sales in East

RAYMOND J WERNER has been promoted to Eastern District sales manager of the Chemical Division of Celanese Corporation of America. RICHARD A SCHWAB has been named New England District Maager, succeeding Mr Werner in that post.

• Samsa Joins Staley Research Staff

The appointment of DR EDWARD G SAMSA to the research staff of the A E Staley Manufacturing Company, corn and soybean processors, has been announced by L O Gill, technical director. Dr Samsa will work as a research chemist in the company's oils and protein laboratory. He was employed formerly by E J Brach & Sons and the Armour Research Foundation, Chicago.

• Hebbard New NPA Deputy Chief

The National Production Authority, U S Department of Commerce has appointed GEORGE M HEBBARD of Bay Ridge, Md as deputy chief of the Inorganic and Agricultural Chemicals Branch of the Chemicals Division. Mr Hebbard is on leave as vice president of operations and engineering of Davison Chemical Corp, Baltimore, Md. He will assist FREDERIC ARDEN, chief of the branch, which includes the following sections: sulfur, inorganic acids, metallic salts, compressed gases, alkalies and agricultural chemicals.

OBITUARY

Charles W Berg

CHARLES W BERG, 62, died on Saturday afternoon, September 1, of a heart attack at his summer home in Ventnor, N J.

Charles W Berg

Mr Berg, a member of the AATCC and the Processing Oils and Chemicals Association, was noted for being one of the originators of the cold scouring method for textile fabrics. The founder of the Charles W Berg Laboratories, he was active in the textile specialties field for over 40 years.

TECHNICAL LITERATURE

Vacuum Impregnation

Catalog No 710
F J Stokes Machine Company
5500 Tabor Road
Philadelphia 20, Pa
Available on request.

This 32-page brochure on vacuum impregnation contains an explanation of the process, a detailed list of applications, and descriptions of equipment used.

Vacuum impregnation, which introduces an impregnating agent into a chamber where a high vacuum has been drawn, permits treatment with impregnants of many materials which would be difficult or impossible to treat satisfactorily under atmospheric pressure. Among its applications are insulation of electrical equipment and weatherproofing of textiles.

One of the most unusual applications is in the production of machine-made lace. This leaves the loom in sheets up to 21 feet wide, the sheet composed of several patterns of varying widths fastened together with basting thread Manual removal of basting threads was formerly necessary, but vacuum impregnation has expedited separation of the strips: the basting threads are now of cellulose acetate, which is dissolved by impregnation of the lace with acetone in a vacuum chamber leaving the patterns separated for winding on individual cores.

Cotton From Field to Fabric

National Cotton Council
P O Box 18
Memphis 1, Tenn
$3.25 per copy.

This new official reference book of 47 pages describes how cotton is cultivated, harvested, graded, marketed, ginned, spun, woven and finished. It reviews the history of cotton and its role in peace and war today.

In a colorful special section are displayed 112 actual swatches of cotton fabrics, ranging from basic gray goods to finished types. The samples, contributed by some 69 textile mills, represent all standard constructions and a variety of special finishes as used for apparel, household items, home decorations and industrial purposes. Each sample is accompanied by a description of the fabric and its uses.

Written and published by the staff of the Cotton Council, the manual is an extensively revised, fifth edition of a book first published in 1939 under the title, "Cotton From Raw Material to Finished Product."

Differential Converter

Minneapolis-Honeywell Regulator Company
Brown Instruments Division
Wayne and Windrim Division
Philadelphia 44, Pa
Available on request (refer Station 40).

A new mercuryless flow meter, said to feature fast speed of response for flow control and continuous range change adjustment from 0-20 to 0-200 inches of water, is described in a 16-page catalog.

Operating principles of this pneumatic-balance type flow transmitter are covered, as well as construction features, typical applications, detailed specifications, and installation methods. Catalog 2281.

Annual Report of the National Bureau of Standards, 1950 (NBS Miscellaneous Publication 200)

113 pages; 28 halftone illustrations
Government Printing Office
Washington 25, D C
50 cents.

Summarizing the scientific investigations conducted by the National Bureau of Standards during the fiscal year 1950, this booklet contains accounts of current activities as well as more detailed descriptions of especially important scientific developments.

Detergent Data File

Dexter Chemical Corporation
Boulevard P O Box 1
New York 59, N Y
Available on request.

A handy file folder on the subject of detergents.

The literature and subsequent inserts to be added from time to time, include such topics as evalution of detergents by chemical analysis, use of builders and sequestering agents in detergents, differences between anionic, cationic and nonionic detergents, surface tension, standard soiled cloth and other physical tests.

represent all
a variety of
pparel, house-
ns and indus-
le is accom-
he fabric and

the staff of
anual is an
ion of a book
der the title,
l to Finished

erter

tor Company

tation 40).

neter, said to
nse for flow
e change ad-
00 inches of
page catalog.
is pneumatic-
are covered,
tures, typical
cations, and
2281.

National
950 (NBS
ion 200)

tions

nvestigations
Bureau of
ar 1950, this
current ac-
iled descrip-
nt scientific

File

e subject of

uent inserts
me, include
etergents by
uilders and
ents, differ-
ic and non-
on, standard
l tests.

ber 15, 1951

a finished product...in one package...

for your protection!

*CALCONYL®

STABILIZED AZOICS

(POWDERS, DOUBLE AND SINGLE SOLUTIONS)

CALCONYLS provide maximum simplicity and trouble-free operation—from start to finish—in stabilized azoic printing.

The CALCONYL line of stabilized azoics has been set up *after* all possible combinations were reviewed by our research staff. Only the most desirable combinations of naphthols and stabilized bases have been selected, after careful testing for best performance from the standpoint of:

Fastness
Working properties
Color value
Stability
Reproducibility

Close supervision of manufacture of the finished product in our plant minimizes chance of error and permits uniformly satisfactory and predictable results.

Your Calco representative will be glad to recommend the particular type of dye that will most effectively meet your specific needs.

Calco®

AMERICAN Cyanamid COMPANY

CALCO CHEMICAL DIVISION, DYESTUFF DEPARTMENT
BOUND BROOK, NEW JERSEY

REPRESENTED IN CANADA BY:
NORTH AMERICAN CYANAMID LIMITED
CALCO CHEMICAL DIVISION, MONTREAL—TORONTO

Calconyl Blue G, Calconyl Scarlet R
Calconyl Red B, Calconyl Red G, Calconyl Red GB, Calconyl Red R
Calconyl Yellow 2G, Calconyl Yellow G, Calconyl Golden Yellow R

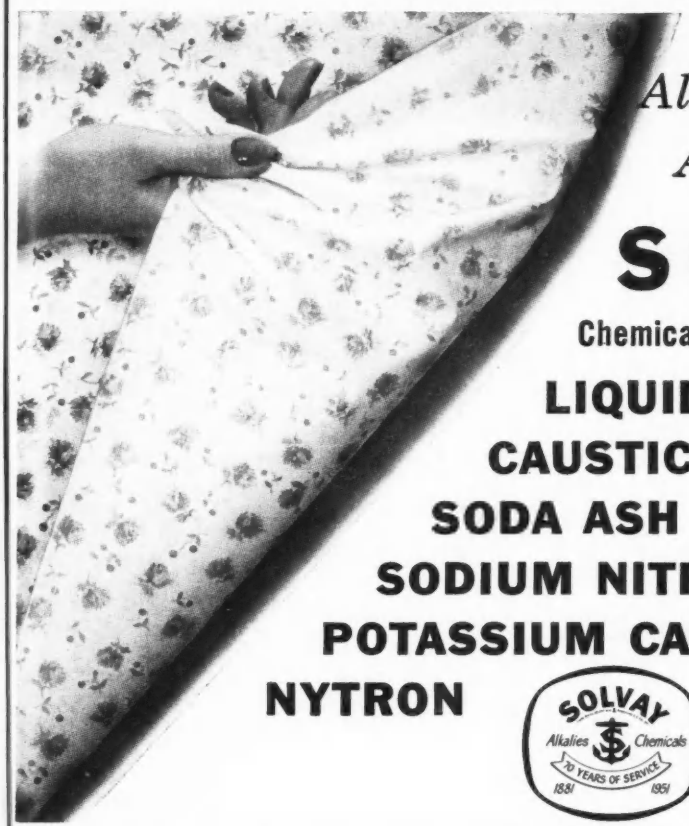
UNI

YO

Sout

West

October 1



Always Dependable...
Always Uniform

SOLVAY

Trade-Mark Reg. U. S. Pat Off.

Chemicals for the Textile Industry

LIQUID CHLORINE
CAUSTIC SODA
SODA ASH
SODIUM NITRITE
POTASSIUM CARBONATE
NYTRON

SOLVAY Alkalies Chemicals 70 YEARS OF SERVICE 1881 1951

SOLVAY SALES DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

BRANCH SALES OFFICES:
Boston • Charlotte • Chicago • Cincinnati • Cleveland • Detroit
Houston • New Orleans • New York • Philadelphia • Pittsburgh
St. Louis • Syracuse

products for...

KIER BOILING
BOILING OFF
SCOURING
SIZING
DESIZING
BLEACHING
DYEING
SOFTENING
FINISHING

Inquiries Solicited

UNITED CHEMICAL PRODUCTS CORP.
Main Office and Plant:
YORK AND COLGATE STREETS • JERSEY CITY 2, N. J.
Branches:
Southern Division P. O. Box 1237 New Orleans 10, Louisiana
Western Agents: CHEMICAL PRODUCTS CORP., AURORA, ILL.

MILLMASTER

IMPORTED AGENTS
FOR
BLEACHING
OXIDIZING
DEODORIZING
DISINFECTING

PROMPT SHIPMENT

CARBAMIDE PEROXIDE	$CO(NH_2)_2\ H_2O_2$
SODIUM CHLORITE	$NaClO_2$
SODIUM PERCARBONATE	$NaCo_3\ H_2O_2\ \frac{1}{2}H_2O$
SODIUM PYROPHOSPHATE	$Na_4P_2O_7\ 2H_2O_2$

PROMPT SHIPMENT

MILLMASTER
CHEMICAL CORPORATION
420 Lexington Avenue
New York 17, N. Y.
Cable Address: "Millmaster"

MILLMASTER

PENETRANTS • DETERGENTS • SOFTENERS • REPELLENTS • FINISHES

BURK-SCHIER

BURKART-SCHIER CHEMICAL CO., CHATTANOOGA, TENN.

• CLASSIFIED ADVERTISEMENTS •

EMPLOYMENT SERVICE—Over 50 Years in Business

EXECUTIVES seeking new positions are invited to file their confidential applications with us and we will keep them informed of opportunities in textile mills.

EMPLOYERS with vacancies to fill or replacements to make will save valuable time by phoning, wiring or writing us their personal requirements.

CHARLES P. RAYMOND SERVICE, Inc.
294 Washington St. Boston 8, Mass.
Phone LIberty 2-6547
Specialists in Placing Textile Mill Executives

CHEMISTS AND CHEMICAL ENGINEERS by prominent Southeastern textile company for development and research. Experience and advanced training desirable but not necessary. Please write details of education, experience and salary requirement. Write Box No. 199.

WANTED: Southern district salesman and northern district salesman with technical background and experience in textile dyeing and finishing to handle sales and technical service for dyes. State age, education and experience. Compensation dependent on experience and past record. Replies will be held in strictest confidence. Write: Pittsburgh Coke & Chemical Company, Fine Chemicals Division, Pittsburgh 25, Pa.

WANTED—Northern R. I. Finishing Plant, Laboratory Technician with textile school background as assistant to plant chemist. Some plant experience desirable. Young man preferred. Write stating full qualifications, etc., and salary desired. All replies will be kept strictly confidential. Write Box No. 200.

POSITION WANTED: Graduate chemist-textile colorist offers valuable laboratory and mill background in dyeing of natural and synthetic fibers including newest acrylies. Interested in a position in process development or as assistant to production chief. Age 30. Married. Write Box No. 202.

POSITION WANTED: Technical Sales. Large following, wide experience on all types dyeing equipment, backed with wet and dry finishing experience. Business training, consulting and executive background. Married. Write Box No. 186.

DYEING-PRINTING PLANT SOUGHT—Interested in communicating with owner of small textile printing and dyeing plant who would consider selling same to European emigrant after one or two years' collaboration. Write P.O. Box 226, Church St. Station, New York 8, N. Y. Department 35G.

SALES REPRESENTATIVE AVAILABLE. Aggressive manufacturer's agent will sell your chemicals, dyestuffs, equipment, etc., to New England textile plants. Excellent contacts and references. Write Box No. 201.

POSITION WANTED: Technically trained dyestuff man with many years of experience in selling and other essentials, requires a position as salesman for well established dyestuff firm or purchasing agent for a mill. Write Box No. 193.

Experienced textile chemist and colorist seeks wider opportunities. Twenty-five years in charge of plant laboratory, some practical dyeing. Experienced in scouring, bleaching, dyeing and finishing, natural and synthetic fibers, good color matcher and formulator. Familiar with all classes of dyestuffs. Write Box No. 204.

WANTED: TEXTILE COLORIST. Must be familiar with roller printing on Viscose and Acetate and Mixtures. Willing to locate anywhere in U. S. or Canada. Permanent position with an old established and growing company. Mail resume to Box No. 207.

POSITION WANTED: Ambitious, alert, aggressive young man desires change offering future and opportunity to fully utilize training and ability. Well-rounded scholastic background including advanced degree in Chemical Engineering. Two years experience on diversified textile program including development, production, and laboratory operation. Write Box No. 210.

● Classified Advertisements ●

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery wanted or for sale—the rate is $7.50 per column inch or less per insertion.

WANTED: Southern district salesman. Graduate of a recognized textile college preferred. Excellent opportunity for the right man. Please state age, experience, draft status, and salary expected. Write P.O. Box 208, Dublin, Georgia.

POSITION WANTED: Chemical Engineer, B.E. and M.S. in Chemical Engineering from accredited university. Age 23, married. Eighteen months textile mill experience including development and production in printing, yarn and hosiery dyeing. Working familiarity with cotton, rayon, nylon, acetate, Orlon, Dynel fibers, nearly all classes of colors. Two patents applied for. Write Box No. 211.

WANTED SALESMAN—for Northern District area with technical background and experience in textile dyeing and finishing to handle sales of chemical specialties, finishes and detergents. Man must be young, energetic, and likeable. Interesting proposition to the right party. Write Box No. 213.

WANTED—dyer experienced on synthetic—filament and spun—fabrics and blends. Excellent opportunity—employment in south with large, well-established company. All applications must include full details of work experience, background and salary expected. Write Box No. 212.

OVERSEER OF DYEING—Young, unmarried man with 13 years experience in the woolen and worsted industry, desires position with a substantial concern. Excellent references. Write Box No. 209.

WANTED: CHEMIST—Familiar with making Wax Emulsions and general line of Specialties for Textiles for old established company in Philadelphia. Write Box No. 214.

REPORTER CLASSIFIEDS BRING RESULTS

STATEMENT OF THE OWNERSHIP, MANAGEMENT, AND CIRCULATION REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233), OF AMERICAN DYESTUFF REPORTER, published bi-weekly at New York, N. Y., for October 1, 1951.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Howes Publishing Company, Inc., 44 East 23rd St., New York 10, N. Y.; Editor—Norman A. Johnson, 44 East 23rd St., New York 10, N. Y.; Managing Editor—Charles A. Whitehead, 44 East 23rd St., New York 10, N. Y.; Business Manager—Myron D. Reeser, 44 East 23rd St., New York 10, N. Y.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 per cent or more of total amount of stock. It not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

HOWES PUBLISHING COMPANY, INC., 44 East 23rd St., New York 10, N. Y.; Cecile R. Howes, State Line, Mass.; M. D. Reeser, Orange, N. J.; Corinne R. Curtis, 312 West 23rd St., New York City; N. H. Hiller, Carbondale, Pa.; H. F. Crawford, Baldwin, L. I., N. Y.; Richard H. Olney, Barnstable, Mass.; L. R. Keeffe, West Redding, Conn.; C. E. Tolsdorf, Forest Hills, N. Y.; N. A. Johnson, Rye N. Y.; E. J. Finan, Valley Stream, L. I.; Derfla Howes Schneer, Reno, Nevada; Shirley I. Reeser, Orange, N. J.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

NORMAN A. JOHNSON, Editor

Sworn to and subscribed before me this 28th day of September, 1951.

(SEAL) CAROLINE ESSENBREIS

Notary Public, State of New York. No. 24-1132800. Qual. in Kings Co. Cert. filed with Kings and N. Y. Co. Clks. and Reg. Term Expires March 30, 1953.

PARAPON SA®

not only produces a LEVEL and SOLID shade but also improved SOFTNESS

This means that it is valuable for use in operations where it is desirable to soften the yarn or fabric directly in the dye bath.

This is especially true in dyeing acetate fabrics for eliminating crack or crease marks.

Parapon S A is not affected by acid, alkaline or salt solutions normally used in dyeing or precipitated by hard water; thus it may be used effectively in practically all dyeing processes, including pressure machines.

TWO ESPECIALLY ADVANTAGEOUS USES OF PARAPON S A:

1. ***for pasting up acetate dyes in order to obtain uniform dispersion of the color in the dye bath***
2. ***as an addition to peroxide bleach baths for greater penetration of the liquor, a uniform bleach and increased softness***

Write for Technical Service Bulletin #210-113.1

Arkansas Co. INC.

NEWARK, NEW JERSEY

Manufacturers of Industrial Chemicals for over 45 Years

AC INC.®

● INDEX TO ADVERTISERS ●

Alco Oil & Chemical Corp.	
Althouse Chemical Co., Inc.	
Amalgamated Chemical Corp.	
American Aniline Products, Inc.	V
American Cyanamid Co. (Ind. Chem. Div.)	
American Dyewood Co.	
American Polymer Corporation	
Antara Products Division of General Dyestuff Corp.	
Apex Chemical Co., Inc.	
Arkansas Company, Inc.	XXVIII
Armour and Co.	
Arnold, Hoffman & Co., Inc.	XIII
Atlantic Chemical Co., Inc.	
Atlantic Chemical Corporation	
Atlantic Refining Co.	
Atlas Electric Devices Co.	
Aula Chemicals, Inc.	
Barium Reduction Corp.	
Becco Sales Corp.	
Belle Chemical Company	
Berg Laboratories, Charles W.	
Berkshire Color and Chemical Co.	
Bersworth Chemical Co.	
Bick & Co., Inc.	
Blickman, Inc., S.	
Burkart-Schier Chemical Co.	XXVI
Butterworth & Sons Co., H. W.	
Calco Chemical Division, American Cyanamid Co.	XXIII
Calgon, Inc.	XVIII
Campbell & Co., Inc., John	
Carbic Color & Chemical Co., Inc.	XX
Carbide & Carbon Chemicals Co., A Division of Union Carbide and Carbon Corp.	
Catalin Corp. of America	
Ciba Company, Inc.	III
Colgate-Palmolive-Peet Company	
Commonwealth Color & Chemical Co.	XXXII
Crucible Steel Co. of America	
Dexter Chemical Corp.	
Drew & Co., Inc., E. F.	
Du Pont de Nemours & Co., Inc., E. I. Dyestuffs Division Fine Chemicals Div.	XIX
Eco Engineering Co.	
Emery Industries, Inc.	
Emkay Chemical Co.	
Fancourt & Co., W. F.	
Gaston County Dyeing Machine Co.	
Geigy Company, Inc.	Front Cover
General Dyestuff Corp.	XV
Gotham Instruments Division of Machine & Metals, Inc.	
Grinnell Co., Inc.	
Gross & Co., A.	
Gurley, W. & L. E.	
Hardesty Co., Inc., W. C.	
Hart Products Corp.	
Hercules Powder Co.	
Heyden Chemical Corp.	
Hilton-Davis Chemical Co.	
Hooker Electrochemical Co.	
Houghton & Co., E. F.	
Instrument Development Laboratories, Inc.	
Interchemical Corp., Textile Colors Div.	VIII, IX
International Salt Co., Inc.	IV

ERS
V
XXVIII
XIII
XXVI
XXIII
XVIII
XX
III
XXXII
XIX
Front Cover
XV
VIII, IX
IV

POSITIVE, LOW COST CONTROL OF INDUSTRIAL WASTES...

Effective, positive treatment for phenol, cyanide and other noxious industrial wastes—without excessive installation and operating costs—is now available through the Mathieson Chlorine Dioxide Process. Existing installations, handling both large and small waste volumes, attest to the efficiency and economy of this treating method.

Mathieson's Chlorine Dioxide Process

* Low Capital Investment

A Chlorine Dioxide system to handle an average waste output can be installed for $2000-$3000, and amortization charges are negligible. The equipment consists only of a small holding tank, a chlorine dioxide solution generator and the metering equipment for the chlorine and sodium chlorite solutions.

* Simple Installation

The Chlorine Dioxide system, being extremely compact, can be quickly and easily fitted into the disposal facilities. No special housing is necessary to contain the equipment.

* Minimum Maintenance

The simplicity of the Mathieson Chlorine Dioxide equipment minimizes maintenance and no special technical supervision is required for operation. The chlorine dioxide is fed automatically at the pre-determined rate for safe, positive control.

Mathieson's background of experience, accumulated over many years in the field of sanitation is available to you. Write for information about the Chlorine Dioxide Process. Mathieson Chemical Corporation, Baltimore 3, Maryland.

Mathieson CHEMICALS

9456

SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

RESTEX

see the PRODUCT....

RESTEX

(SYRUPS AND PASTES)
UREA FORMALDEHYDE RESINS

RESTEX

look at its USES....

Treatment for rayons, wool-rayon blends and wools, to obtain improved handle, crease-resistance, shrinkage control, improved wash fastness, increased tear and abrasion strengths.

RESTEX

check the SPECIFICATIONS....

PASTES (mono- and dimethylol urea-formaldehyde)
Solids: 50-55% pH: 7.5-8.0
Available in lined, open-head steel drums.

SYRUPS (dimethylene urea-formaldehyde)
Solids: 45-50% pH: 7.3-8.0
Available in side-delivery steel drums.

RESTEX

count on SUPPLY....

SUPPLY IS *ASSURED*, SINCE WE MANUFACTURE OUR OWN FORMALDEHYDE AND MAINTAIN OUR OWN FLEET OF TRUCKS.

RESTEX

clip the COUPON....

WATSON-PARK COMPANY
Ballardvale, Massachusetts

Please send me technical data on
Restex pastes ☐; Restex syrups ☐.

Name_____
Position_____
Firm_____
Address_____
City_____ State_____

INDEX TO ADVERTISERS

Kali Mfg. Co.	
Kelco Co.	X
Laurel Soap Mfg. Co., Inc.	
Leatex Chemical Co.	
Mathieson Chemical Corp.	XXIX
May Inc., Otto B.	XI
Maywood Chemical Works	XIV
Metalsmith Div., Orange Roller Bearing Co., Inc.	
Millmaster Chemical Corp.	XXV
Minneapolis-Honeywell Regulator Co. (Industrial Div.)	
Monsanto Chemical Co.	
Naftone, Inc.	
National Aniline Division, Allied Chemical & Dye Corp.	XXII
National Milling & Chemical Co.	
National Starch Products	XVII
Naugatuck Chemical Div. of U. S. Rubber Co.	
Nopco Chemical Co.	
Nova Chemical Corp.	
Nyanza Color & Chemical Co., Inc.	
Onyx Oil & Chemical Co.	Second Cover
Pabst Sales Co.	
Pennsylvania Refining Co.	
Perkins & Son, Inc., B. F.	
Pfister Chemical Works, Inc.	
Pfizer & Co., Inc., Chas.	
Photovolt Corp.	
Pittsburgh Coke & Chemical Co.	
Procter & Gamble	
Prufcoat Laboratories, Inc.	
Refined Products Corp.	VII
Richmond Oil Soap & Chemical Co., Inc.	
Rohm & Haas Company	
Royce Chemical Co.	Back Cover
Sandoz Chemical Works, Inc.	
Scholler Bros., Inc.	Third Cover
Smith, Drum & Company	
Solvay Sales Div., Allied Chemical & Dye Corp.	XXV
Sonneborn Sons, Inc., L.	
Standard Brands, Inc.	
Standard Chemical Products, Inc.	
Standard Fabricators, Inc.	
Stein, Hall & Co.	
Synthron, Inc.	
Taylor Instrument Companies	
Tennessee Corporation	
Tennessee-Eastman Co.	
Tex-Chem Co.	
Tinolan Co. of America, Inc.	
Trent Tube Co.	
Union Carbide and Carbon Corp., Carbide & Carbon Chemicals Company	
United Chemical Products Corp.	XXV
U. S. Rubber Co., Naugatuck Chemical Div.	
Vanderbilt Co., Inc., R. T.	
Van Vlaanderen Machine Co.	
Virginia Smelting Co.	
Wallerstein Co., Inc.	
Warwick Chemical Co.	XXXI
Watson-Park Co.	XXX
Westvaco Chem. Div., Food Machinery & Chem. Corp.	
Winthrop-Stearns Inc.	
Wolf & Co., Jacques	
Wyandotte Chemicals Corp.	VI
Young Aniline Works, Inc.	XXXII
Young Co., J. S.	
Zinsser & Co., Inc.	

Save this 1-STOP check chart of textile chemicals

You will find Warwick research-developed, market-proved textile chemicals in more than 20 major fields of application in the textile industry.

We suggest you use Warwick—one of America's largest chemical research and manufacturing companies built on and devoted to products for this industry—for *all* your chemical needs.

You'll enjoy high standards of performance, you'll be assured perfect compatibility between materials, and you can usually cut inventory, buying and book-keeping costs by using a single leading source.

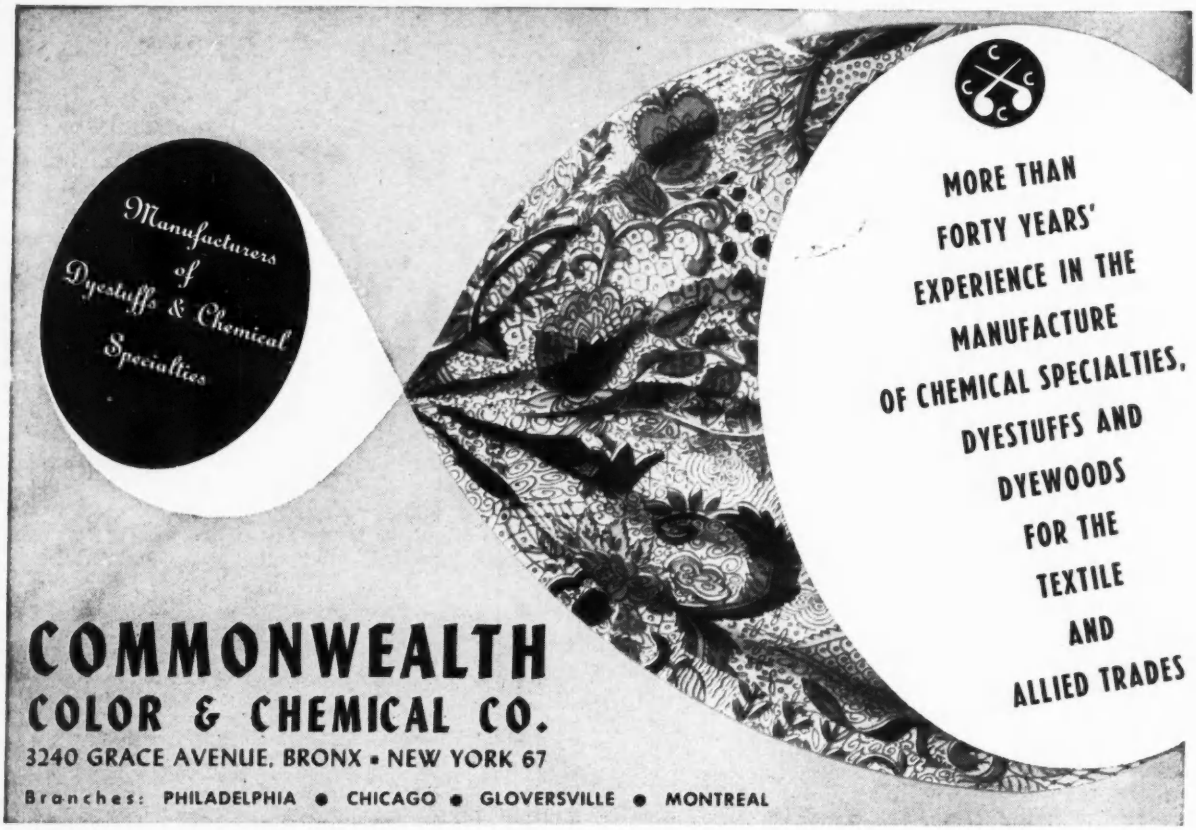
APPLICATION	NAME	COTTON	RAYON	WOOL	NYLON	SILK	LINEN	CHEMICAL NATURE
ANTI-SLIP	WEAVE-LOK*		X		X			water-soluble processed natural resin
ANTI-SLIP	FORMASET* HG		X	X	X			inorganic polymer semi-durable
COATING								
NON VOLATILE	PLASTISOL	TEXTILES, PAPER						vinyl resin dispersions
VOLATILE	ORGANOSOL	TEXTILES, PAPER						vinyl resin dispersions
COLOR FIXATIVE	WARCOFIX*	X	X	X	X	X	X	quarternaryammonium compound
COLORS, DISPERSED	SUNTONE*	VINYL						pigments dispersed in resinous and chemical plasticizers
COLORS, PAD DYEING	SUNTONE*	X	X	X	X	X	X	dispersed pigments and resinous binders
COLORS, PRINTING	SUNTONE*	X	X	X	X	X	X	dispersed pigments and resinous binders
COLORS, PRINTING	SUNTONE*	PLASTICS						dispersed pigments and resinous binders
FINISHES								
BODYING AGENTS	SETOLE* AF	X						aqueous dispersions of thermo-setting resins
CRUSH RESISTANT	FORMASET* SN		X					methylolurea type thermo-setting resin
DULLER	ANTILUSTEROLE*		X		X			aqueous dispersion of inorganic pigments
FIRE RETARDANT	WARCONYL* A	X	X					blend of inorganic salts
GLAZING (DURABLE)	FORMASET* 10-D	X						dimethylurea-ether polymer
GLAZING (DURABLE)	FORMASET* SN		X					methylolurea type thermo-setting resin
MILDEW PROOFING	KUPRATE*	X	X	X	X	X	X	solubilized copper 8 quinolinolate
MILDEW PROOFING	G-4 EMULSION-20	X	X	X	X	X	X	emulsion containing 20% G-4. Compatible with emulsion-type water repellents.
RIBBON FINISH	SETOLE* D EXTRA		X					water-soluble alkyd resin
SEWABILITY FINISH	WARCO* A 221	X						non-ionic emulsion
SHRINK RESISTANT	FORMASET* SR	X	X					ketone aldehyde type thermo-setting resin
SHRINK RESISTANT	FORMASET* SN		X					methylolurea type thermo-setting resin
SHRINK RESISTANT	FORMASET* 10-D		X					partially polymerized urea-formaldehyde type resin
SHRINK RESISTANT	FORMASET* C	X	X	X	X		X	controlled formalizer of fibers—highly wash resistant
SOFTENERS								
ANIONIC	APPRETOLE*	X	X				X	alkyl amide dispersion
CATIONIC	APPRAMINE*	X	X		X		X	substituted fatty amide
HEAVY-BODIED	TORRIDEX*	X	X					sulfonated tallow
OXIDATION RESISTANT	WARCOLENE* 171	X	X				X	sulfated fatty acid ester
WATER REPELLENT DURABLE	NORANE* R	X	X					chloromethylated quaternary ammonium compound
WATER REPELLENT DURABLE	NORANE* W			X	X			wax emulsion plus metal salt complex
WATER REPELLENT RENEWABLE	IMPREGNOLE*	X	X	X	X	X	X	wax emulsion with polyvolent salts
GAS FADING INHIBITOR	WARCO* GFI		X					high molecular weight amino compound
GAS FADING INHIBITOR	WARCO* GND		X					mixed organic amines (non-durable type)
KIER BOILING COMPOUNDS	KIEROLE*	X	X				X	sulfonated fatty acids
KIER BOILING COMPOUNDS	COLOROLE*	X	X				X	sulfonated fatty acids
LUBRICANT (YARN, FABRIC)	WARCOLENE*	X						solubilized oil
LUBRICANT	WARCO* A 221	X						non-ionic emulsion
PENETRANTS—REGULAR	WARCOSOL*	X						sodium alkylnapthalenesulfonate
PENETRANTS—NON-FOAMING	WARCOSOL* NF	X	X	X				blend of organic esters
PENETRANTS—MERCERIZING	EUMERCIN*	X						cresylic and non-cresylic types
PIGMENT PRINT BINDERS	SUNTONE* CLEARS	X	X					emulsified resinous compounds
PIGMENT PRINT BINDERS	FORMASET* 20	X	X					partially polymerized urea-formaldehyde resin
TAR AND GREASE REMOVER	LANOLE*	X	X	X	X			detergent solution in organic solvent
SYNTHETIC DETERGENT	SULFANOLE* KB	X	X	X	X	X	X	sodium alkylarylsulfonate
SYNTHETIC DETERGENT	SULFANOLE* CP	X	X	X	X	X	X	sulfated fatty amide
SYNTHETIC DETERGENT	SULFANOLE* S GEL Conc.	X	X	X	X	X	X	sulfonated fatty amide
SYNTHETIC DETERGENT	SULFANOLE* AN	X	X	X	X	X	X	fatty acid amine condensate
WETTING AND REWETTING	WARCOSAN*B Conc.	X	X					sodium alkyl ester sulfate
WOOL SCOURING	LANOLE* B		X	X				stabilized organic solvent soap compound

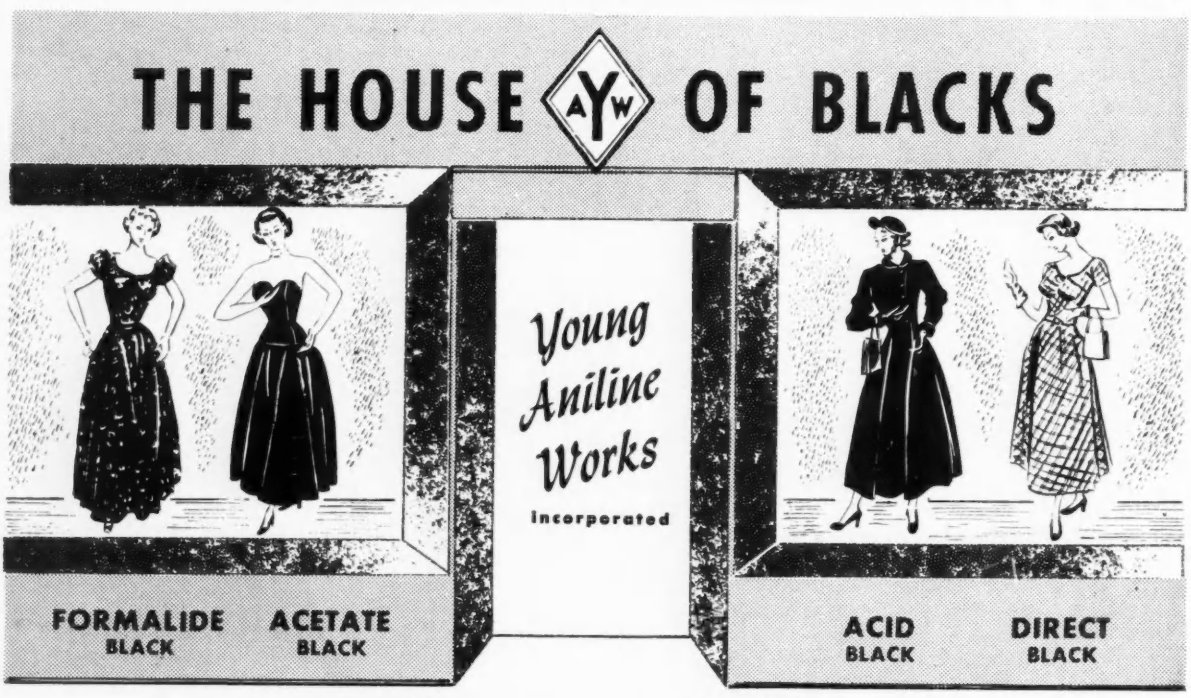
*Trade Mark Reg.

WARWICK CHEMICAL COMPANY, DIVISION of Sun Chemical Corporation

Detailed technical information, samples and counsel on any Warwick product sent on request. Write, wire or phone . . .

10th STREET AND 44th AVENUE, LONG ISLAND CITY, NEW YORK


Manufacturers of Dyestuffs & Chemical Specialties
MORE THAN FORTY YEARS' EXPERIENCE IN THE MANUFACTURE OF CHEMICAL SPECIALTIES, DYESTUFFS AND DYEWOODS FOR THE TEXTILE AND ALLIED TRADES
COMMONWEALTH
COLOR & CHEMICAL CO.
3240 GRACE AVENUE, BRONX • NEW YORK 67
Branches: PHILADELPHIA • CHICAGO • GLOVERSVILLE • MONTREAL


THE HOUSE AYW OF BLACKS
Young Aniline Works
Incorporated
FORMALIDE BLACK
ACETATE BLACK
ACID BLACK
DIRECT BLACK
Office and Factory
2731 Boston Street, Baltimore 24, Md.
Paterson Office
50 East 13th Street, Paterson, N. J.
Consult your local dyestuff distributors for information and samples. Shipments can be made from their convenient stocks or from our Baltimore and Paterson warehouses.

DURA BEAU *Finishes give hosiery—and all textiles—the "lift" that sells . . . a smoky-dull allure—an eye-appeal that bespeaks quality and value! . . . plus increased resistance to runs, snags and spots.* DURA BEAU *Finishes make all hosiery and textiles more* DURA*ble . . . more* BEAU*tiful!*

Posed Exclusively for DURA BEAU
VIVECA LINDFORS
Starring in
"The Flying Missile"

Dura Beau
Reg. U.S.A. and Canada
TEXTILE FINISHES

SCHOLLER BROS., INC. • Manufacturers of Soaps, Softeners, Sulphonated Oils and Finishes • Collins & Westmoreland Sts., Phila. 34, Pa. • St. Catharines, Ont., Can.

parolite©

Big and little
sister coats
by Reisman-Rothman
in an Eastland Woolen
reprocessed wool.

soluble zinc sulphoxylate formaldehyde

Extremely high concentration, absolute uniformity, maximum stability, complete solubility combine to make Parolite your best bet for fast, economical, consistently thorough stripping of woolens, acetates, nylon, mixed fabrics or reworked wools.

Royce

ROYCE CHEMICAL CO.

CHEMICAL COMPANY • CARLTON HILL, NEW JERSEY

Manufacturers of Chemicals for the Textile Industry

7901

DO NOT CIRCULATE

en

ehyde

ormity,
ne to
omical,
acetates,
.

7901